



THE EFFECT OF SELF-REGULATED LEARNING THROUGH ONLINE TUTORIALS INTEGRATING LEARNING STRATEGY IN IMPROVING THE INDEPENDENCE AND ACADEMIC ACHIEVEMENT OF BIOLOGY EDUCATION STUDENTS

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Abstract

The students of long distance education were required to have high self-regulated learning so they could survive and succeed in their study. Therefore, they have to be trained to do self-regulated learning so that they could improve their academic achievements. This research was a quasi-experimental research involved 63 the students of long distance education of Biology Education who got used to do self-regulated learning through online tutorials integrating learning strategy and were given a guide of self-regulated learning and 48 the students who did not receive the treatments. After the online tutorials finished, the students filled the scale of self-regulated learning and had final exams. Besides, they filled open ended questionnaire and were interviewed. Based on the statistical results, the students who got self-regulated learning through online tutorials integrating the learning strategy and the learning guide significantly got higher score of self-regulated learning compared to the students who did not. Likewise the students' academic achievements were significantly higher than the students without treatments. In the future, it is suggested that the integration of the learning strategy into online tutorials should be done to all courses so that the students can have higher self-regulated learning influenced the academic achievements.

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INTRODUCTION

The self-regulated learning was the students' level of ability to actively self-control, organize, and self-monitor during the learning process so that the academic achievement could be acquired (Zimmerman and Schunk, 2001). Self-regulated learning correlated with the students' motivation, meta-cognition, and behavior in their learning process (Zimmerman and Martinez-pons, 1988). Therefore, self-regulated learning related to how the students self-managed their learning process to achieve their academic goals. A student who was independent was the active one in maximizing their chances and skills in learning. They were able to control their cognitive activities besides developing the skills related to their willingness of self-regulation, environment, and behavior in order to elevate positive outcomes.

In the distance learning environment, the activities related to self-regulated learning really supported the success of the study (Andrade, 2012). Radovan's (2011) research results showed that motivation and effort to organize a strategy were an important factor in the success of the study of the distance learners. Darmayanti (2004) examined the effectiveness of self-regulated learning (SRL) skill and exemplary interventions in improving the self-regulatory ability and the academic achievement of the distance learners. The result study showed that the interventions of self-regulatory skills especially the learning need component, it was effective to improve the first year distance learners' self-regulated learning, nonetheless the exemplary intervention and the combination of exemplary and self-regulatory skill were not effective to improve the first year distance learners' self-regulated learning and their academic achievements. The self-regulatory skill and exemplary were in the printed forms which were posted to the learners.

The students of Biology Education Program in UT were mostly teachers with various responsibilities, such as teaching for more than 38 hours each weeks, becoming The students Council's advisor, becoming a vice headmaster, managing household, and other social activities. Based on the researcher's interview with the students, they found difficulties in maintaining their times. Furthermore, based on the introductory study, 71% from 102 respondents of Biology Education the students had self-regulation in adequate level and unsatisfying academic achievement. However, the components

of self-regulated learning particularly the strategies to achieve goals, self-monitoring, learning time management, self-evaluation and self-awareness needed to be improved.

Considering the results of the previous study, the Biology Education the students of UT should be given guidelines of self-regulatory strategy and get used to apply it by integrating it into the learning sources such as online tutorial. The online tutorial was an alternative learning material for the students, nonetheless according to Rowe and Rafferti (2013), an online learning required higher self-regulation compared to a face to face learning. Considering the importance of self-regulation possessed by the students of Biology Education and the little amount of related studies, in this opportunity the writer wanted to study about the use of self-regulated learning through online tutorials integrating learning strategy in improving self regulation and academic achievement of the distance learners of Biology Education.

METHOD

The research method used was quasi experimental method, where there were 65 the students of Biology Education of UT who got self-regulated learning guidelines and the habit of self regulation through online tutorials in Biology learning strategy, Biology learning evaluation, animals' growth, and anatomy and also human's physiology and 48 the students without the treatments. The guidelines of self-regulated learning in the printed form were sent by post, beside that the soft files were presented during the online tutorials. There were several self-regulated learning strategies integrated into the online tutorials as self-regulatory practices, such as: (1) goal setting and weekly learning schedule; (2) mind mapping; (3) self questioning and answering; (4) self-monitoring; (5) self-reflection regarding concept mastery related to the self-regulatory practices in the online tutorials.

The students followed the online tutorials for 8 weeks. At this stage, the students were given self-regulatory practices concerning strategies, goals, and learning schedules in the first week. On the second, fourth, sixth, and eighth weeks the students were given practices about strategic planning, monitoring planning

implementation, scheduling, and goal setting, organizing mind mapping related to the learning materials for the week, arranging five relevant questions and answers, and self-reflecting on the concept mastery. After the online tutorial period, the students filled the self-regulatory scales which were sent through the online tutorial, email, and post, they also filled the open-ended questioners, and were interviewed. On the examination day, they took their final exam.

The self-regulatory scale was used to gain data about the students' self-regulated learning. The scale was a modification of MLSQ (Motivation for Learning Strategy Questionnaire) developed by Pintrich et al. (1993) referring to the aspects of self-regulated learning according to Zimmerman (2008) and Pintrich (2004). It was developed based on two dimensions, which were motivation and learning strategy. The dimension of motivation covered intrinsic and extrinsic motivations and self-efficacy. The dimension of learning strategy encompassed

goal setting, strategic planning to achieve academic and scientific goals, self-monitoring, learning source and environment managing, time management strategy, self regulating, self-evaluating, and self-reacting. Alpha Cronbach's reliability scale of self-regulated learning of the tryout result was 0.837 which meant that the self-regulatory scale had high reliability.

RESULT AND DISCUSSION

The effect of self-regulated learning to the distance learners' improvement of their self-regulation

To know the effect of self-regulated learning through online tutorials integrating learning strategies, after underwent the prerequisite test (data normality and homogeneity variants), then the experimental and control groups took the average difference test. The result of the tests could be seen in the Table 1.

Table 1. The independence of learning end of the experimental group and the control group
Description of Treatment Description

Description	Treatment		Description
	With Treatment	Without Treatment	
N (amount of data)	48	65	113
Mean	2.55	3.21	
SD	0.285	0.347	
Test of the average difference	t-test		
	If the value of $\text{sig} > \alpha$ ($\alpha = 0.05$) then H_0 is accepted		
Significance	0.00		
Interpretation	H_0 is rejected, then there is a significant difference		

Based on Table 1, it is known that H_0 showed that there was no difference on average score of self-regulated learning between the experimental group and the non-experimental group, rejected. This meant that the average of the final self-regulated learning of the experimental group was significantly different from the non-experimental group with $p\text{-value} = 0.00$ on $\alpha = 0.05$. The average of the final self-regulated learning between the students with treatments and without treatments was significantly different, where the students with treatments had higher final self-regulated learning than the students without treatments. This result indicated that self-regulated learning through online tutorials integrating learning strategies effectively caused the students with that treatment had higher self regulation than the students without that treatment.

This is in line with the results of the previous studies which found that the scores of the self-regulatory groups with self-regulated learning interventions had significant difference with the controled group (Darmayanti, 2005; Arsal, 2009; Cleary, Platten, and Nelson, 2008).

The students with self-regulated learning through online tutorials had higher self regulation than the students without that. This was expected because the experimental group got the guideline book and learned it and then applied the learning strategy through the online tutorial. Based on the gathered data, 100% the students stated that they received the books, and 97.5% finished learning the books. On the other hand, about 60.8% the students applied the learning strategies weekly.

A similar research was conducted by Darmayanti (2005) by intervening the self-regulated learning skill through smart learning strategy and modeling. The research result showed that there were significant difference between the students with only smart learning strategy treatment and the control group on their self-regulated learning skills, nonetheless there was no significant difference between the groups when the experimental group got both smart learning strategy and modeling treatments.

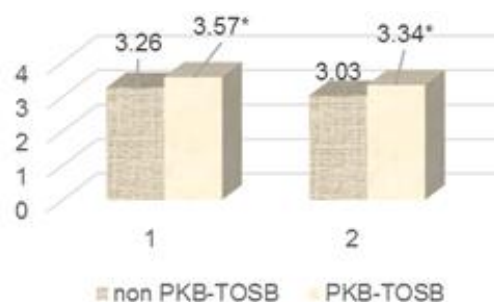
A research of interventions in the form of SFL skill training was also carried out by another researcher. Aرسال (2009) in his study trained his the students for 14 weeks to apply self-regulated learning in the daily learning activities and then he wrote related reports about the activities in form of a diary. The result study showed that the experimental group's intrinsic motivation, assignment grade, metacognition, time management strategy, and learning outcome were significantly different from the control group. The improvement of the students metacognition seemed to be influenced by the teachers or researcher's feedbacks.

Another related study which gave self-regulatory training was conducted by Cleary, Platten, and Nelson (2008). In their study, they gave a self regulation empowerment program (SREP) training in the Biology lesson for senior high school the students. The result study proved that the students in the experimental group had significant difference on their self-regulated learning compared to the control group.

Next, after undergoing the normality data test and the homogeneity variant test every aspects of self regulation, to know the effect of self-regulated learning on each aspects of the self-regulatory dimensions, undertook the average difference test. Figure 1 shows that the average scores of self-regulated learning of the experimental group significantly differed from the control group in all aspects of the dimension of motivation. The average score of self-regulatory aspects of intrinsic and extrinsic motivations of the experimental group was significantly different from the control group with $p\text{-value} = 0.00$ at $\alpha = 0.05$. The average score of the self efficacy aspect of the experimental group had significant difference with the control group with $p\text{-value} = 0.00$ at $\alpha = 0.05$.

This indicated that self-regulated learning caused the experimental group to had higher aspects of intrinsic and extrinsic motivations and self-

efficacy than the control group. In other words, it showed that self-regulated learning through online tutorials caused the experimental group to had higher aspects of intrinsic and extrinsic motivations and self-efficacy than the control group. The high motivation aspect of the experimental group compared to the control group could be seen from the students' willingness to follow the online tutorials, even though the online tutorials were optional and not a must for the Biology Education the students of UT. Besides, the grades of the online tutorials only contributed to the final scores, if the final exam scores reached a certain grade. It meant that only the student with high motivation followed the online tutorials and willing to undergo self-regulated learning.



Information:

1 = extrinsic and intrinsic motivation

2 = self efficacy

*) is significantly different at $\alpha = 0.05$

Figure 1. Differences in mean score of learning independence of the Experimental and Control Groups in Motivation Dimension

This is supported by the results of the treatment and the interviewed with the experimental group. According to the intensity of the students' involvement in the online tutorials, the average of the students who followed the activity every week was 60% from the active ones. This showed that the students had enough motivation to follow the tutorial process. In addition, the result of the interview supported the existence of enough motivation and self efficacy from the participants of the online tutorials as follow.

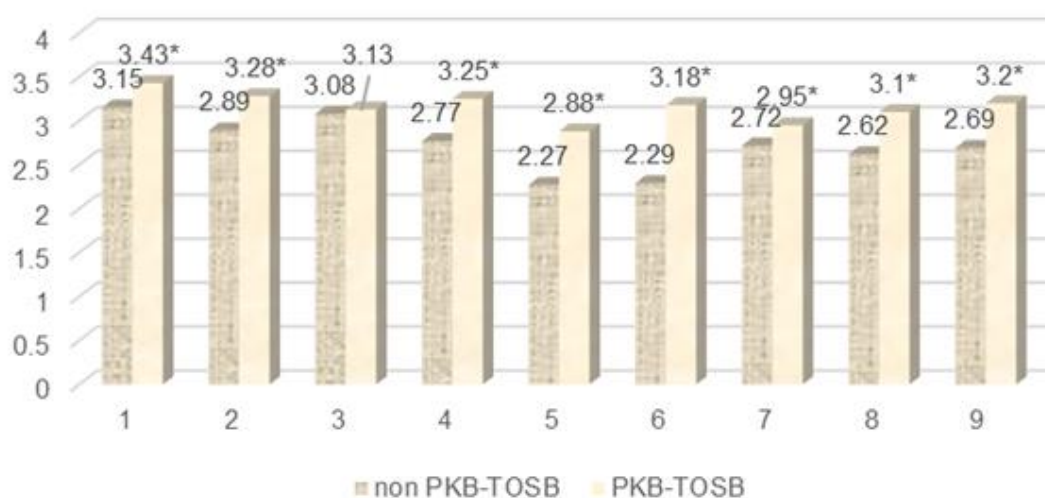
"I am an Agricultural, I continue my study because I want to add my knowledge about Biology learning and had a linear education with the Biology lesson given so that later I could get

teacher certification. By following the online tutorials, I could push myself to study regularly. With my learning strategy, I'm sure that I could get B in the courses I followed" (Heti Herawati).

"I follow the online tutorials because the study times were clear. I want to deepen my biology learning and add knowledge. Besides, I want my knowledge to had linear relationship with the lesson I teach. *Insya Allah*, I could get the best score" (Mudmainah).

From the result of the interviewed, it could be concluded that the students were motivated to have a field of linear science with the lesson taught in their school, get certification, and increase their knowledge. It shows that there were strong intrinsic and extrinsic motivations, and self-certainty to success in the field of linear science. It was relevant with the statement of Farajollahi and Moenikia (2011) which said that the online distance learners were the students who had high motivation in studying, willingness to learn, and dream to improve social status and work environments and improve knowledge.

Then, after the prerequisite test for every self-regulatory aspects of learning strategy dimension, the average test of the learning strategy dimension was hold. The result of the statistical test showed that all of the average scores of the aspects of the learning strategy dimension were significantly different, except the strategy aspect for the scientific goal achievement. In other words, the aspects of goal setting, goal planning, self-monitoring, learning environmental managing, time managing, self-regulating, self-evaluating, and self-reacting in the experimental group were significantly different from the average score of the control group. It meant that the self-regulatory aspects of the experimental group were higher that the control group. This was expected because the experimental group got self-regulated learning while the control group did not. Figure 2 presents the average scores of the learning strategy aspect.



Information:

1. Aspects of Goal Determination
2. Aspects of Strategy Achievement of goals
3. Aspects of Strategy of Achieving Science Objectives
4. Self-monitoring aspect
5. Aspects of Management of learning environment

6. Time Management Aspect
7. Aspects of Self Regulation Efforts
8. Aspect of Self Evaluation
9. Aspects of Self-Reactions

*) Is significantly different at $\alpha = 0.05$

Figure 2. Differences in the mean score of end-learning independence of the Learning Dimension Strategy in the Experimental and Control Groups

The average score of the scientific goal achievement strategy of the experimental and control groups were not that significant with $p\text{-value} = 0.275$ at $\alpha = 0.05$. This was expected because the respondents, either they got self-regulated learning or not, were science or biology teachers thus it was expected in solving problems related to the contents they tended to be influenced by their scientific knowledge. Therefore, when filling the self-regulatory scales, they taught to state that they often learned the course concepts even intensively relating to the natural phenomenon, with the daily life, and the practical material which had been conducted before.

Based on Figure 2, self-regulated learning especially the aspect of learning environment management had significant difference ($p\text{-value} = 0.00$ at $\alpha = 0.05$) and the aspect of time management had significant difference ($p\text{-value} = 0.00$ at $\alpha = 0.05$), where the average of those aspects in the experimental group were higher than the control group. Referring to the self-regulatory scales which were filled by the experimental group, the students often studied in the place where they could concentrate, know when and where the place to study effectively, and try to manage their time well. It was in line with Andrade's (2012) statement that the distance learning the students should be able to create a learning method and a study room so that they could study more effectively, such as studying in a peaceful place and free from disturbance, being in a right time when they could concentrate, and uploading online assignments not in the peak time.

In the online tutorial process of the experimental group, integrating self-regulated learning referred to the guideline of self-regulated learning. The students of the experimental group were trained to arrange their learning plans regularly for 8 week tutorials. In addition, those the students had to be able to organize their learning environment well because they had to adapt the time and place that could access the online tutorials well.

That data are supported with the interview result, where most of the students managed their time and adapted to the learning environment by accessing the online tutorials at night. If the signal were not good, then the online tutorials would be accessed in an internet cafe or in the school. There were some the students who scheduled special times to study the modules, to read the initiated materials, and to download the assessments and to upload the

assessments. It meant that the students adapted to the learning environment and learning time, although some of them still found it difficult to manage their time.

If we connect the students to the time management training, there were approximately 48.7% the students who were involved in every training process. It meant that the students did not optimally follow the training. However, the significant difference in the aspect of time management indicated that the time management training as a part self-regulatory training was effective the students' time management aspect. This result is relevant with Terry (2002) research which tested the effect of web-based time management tool to the time managing behavior. The research result showed that there was a relation between the intended intervention and the students' time management.

According to the data of the students' involvement in making mind mapping and organizing questions and answers on the topics related to the materials of the online tutorials, there were about 57.5% the students of the experimental who organized mind mapping every week and 61.5% the students who made questions every week. It was supported by the students' statements in the self-regulatory scale that in learning the experimental group often read the materials for a while to know how to learn that materials systematically, to make questions to help concentrating their attention to the reading materials, to write an important note, and to re-read if there were materials which were not understood.

Based on Figure 2, there is a significant difference in the average of self monitoring aspect between the experimental group and the control group with $p\text{-value} = 0.00$ at $\alpha = 0.05$. The students of the experimental group had higher self monitoring aspect of self-regulated learning than the control group. This related to the online tutorial process which occurred in the experimental group.

In the online tutorial process, the experimental group integrated the self-regulatory training referred to learning guideline "Strategi Cerdas" with self monitoring and self evaluating. From 63 respondents about 53% the students involved in the activities of self monitoring and self evaluating. The involvement of 53% the students in every training process of self-

monitoring seemed to be able to contribute in improving the average score of self monitoring aspect. In line with this was Kauffman, Zao, and Yang's (2011) study that intervened by using prompt self monitoring in their online learning, where the result study concluded that the prompt self monitoring used could improve learning outcomes and the use of note taking.

The effect of self-regulated on the learning outcomes of the distance learning the students

In order to know the effect of self-regulated on the learning outcomes, the average test of final examination scores, the final score of the experimental group and the control group was done. However, before that the data normality test and the homogeneity variants were occurred. Table 2 presented the descriptive data of the average score

differences of the final examination and final of the experimental and control groups.

Based on Table 2, it is known that H_0 which stated that there was no change in the average score of the final exam between the experimental and control group, it was rejected. It meant that the average score of final exam achieved by the experimental group was significantly different from the control group with $p = 0.00$ at $\alpha = 0.05$. The students of the experimental group got self-regulated learning which caused them to get higher final exam average score than the control group. This indicated that self-regulated learning through the online tutorials integrating effective learning strategy affected the experimental group to score higher in the final exam than the control group.

Table 2. The result of average difference test of score of Final Examination and Final score of the Experimental and Control Groups

Description	Final Exam Score		Final Score	
	Experimental Group	Control Group	Experimental Group	Control Group
N	65	48	65	48
Mean	47.6	36.2	56	36.2
SD	10.8	7.8	15.4	7.8
Average difference test	t-test			
	If the sig-value > 0.05, then H_0 is accepted			
Significance	0.000		0.00	
Interpretation	If H_0 is rejected, then there is significant difference			

Table 2 also shows that nothing changed in the average score of the finals between the experimental and control group, represented by H_0 was rejected. It meant that the average score of finals achieved by the experimental group was significantly different from the control group with p -value = 0.00 at $\alpha = 0.05$. The students of the experimental group got self-regulated learning which caused them to get higher final average score than the control group. This indicated that self-regulated learning through the online tutorials integrating effective learning strategy affected the experimental group to score higher in the finals than the control group.

The data also presented the final exam and final score achievement of the experimental group was adequate compared to the compared group which categorized as low. The final exam scores were the

scores the students got after taking the final examination. This score really depended on ones' ability to remember, understand, and analyze the problems in the test. On the other hand, the final score was the score the students got 70% from the final exam score and the score of the students' participation during the online tutorials.

The higher scores obtained by the experimental group compared to the control group was expected because self-regulated learning integrating learning strategy though the online tutorials gave the students knowledge about learning strategies and help them applied them. It was corresponding with Zimmerman and Schunk's (2001) statement that practices of self-regulated learning strategies could improve the low academic achievement the students. Relevant with the finding and the statement, the

previous research results also found that there was a relation between learning strategy training and the students' achievement. The learning outcome of the group received self-regulated skill intervention was significantly different compared to the control group (Arzal, 2010; Wang et al., 2008; Peng, 2012; Chanlin, 2012; Chang & Chau, 2013). Arzal (2010) used a diary as learning strategy tool to develop the prospective science teachers' self regulation and academic achievement. The result study showed that the learning strategy practices using diary could improve the prospective science teachers' self regulation and learning outcome. Cheng and Chau (2013) used e-portfolio as the tool to train self-regulated learning. The research result showed that the learning strategy through e-portfolio could develop his the students' self-regulated learning skill and learning outcome. On the other hand, Chanlin (2012) in his research found that there was a relation between online learning strategy and the final score of research project.

CONCLUSION

From the research result it can be concluded that self-regulated learning through the online tutorials integrating learning strategy could improve self regulation and academic achievement of the distance learning the students. Therefore, it is suggested that in the future, this self-regulated learning is integrated in the online tutorial of other courses so that the students can make self-regulated learning as a habit or behavior which should be owned by them to improve the distance learning the students' achievement in the end.

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