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Blended Learning Based on Experiential Learning for Self-Regulated Learning Mathematics Education Students

Yani Supriani[1], Rina Oktaviyanthi[2], Ria Noviana Agus[3]
[1,2,3] *Faculty of Social Sciences, Jakarta State University*
yani.supriani2@gmail.com

Abstract

Scientific skill is a special skill helping students to develop their knowledge. Indirectly, well-developed scientific skills will lead them to actively get involved. This special skill needs to be developed through cognitive skills. One of the developed affective skills is self regulated learning. Such skill is developed through blended learning basic experiential learning. This research involves 26 students in mathematics education, University of Serang Raya. This research focuses on topics about line, angle, triangle, and rectangle. This research is quasi experimental research with One Group Pretest Posttest Design using Purposive Sampling technique. The result of analysis shows that students' mathematical justification skill of Junior High School gives positive contribution through experiential learning.

Keywords
self regulated learning; experiential; learning

I. Introduction

During the Covid-19 emergency, most universities enforce online learning for all courses by utilizing various virtual applications to conduct discussions through chatroom forums, as well as access lecture assignments given by lecturers. This requires lecturers to provide innovation in the learning process, one of which is by applying the blended learning model. According to Uwes (2018), blended learning is a learning model that combines synchronous and asynchronous strategies in an effort to create an optimal learning experience to achieve the expected learning outcomes. Where blended learning has the aim of optimizing learning activities for the better, and facilitating the characteristics and independence of student learning. Blended learning does not completely replace face-to-face learning by implementing fully online learning. Blended learning only supports and completes material that has not been conveyed during class learning. As Stein (2017) said in his seminar "although the development of e-learning shows an increasing trend, for now face-to-face meetings are still considered important". The outbreak of this virus has an impact of a nation and Globally (Ningrum et al, 2020). The presence of Covid-19 as a pandemic certainly has an economic, social and psychological impact on society (Saleh and Mujahiddin, 2020). Covid 19 pandemic caused all efforts not to be as maximal as expected (Sihombing and Nasib, 2020).

Therefore, although learning is carried out from home by emphasizing online learning, it is in accordance with the mathematics learning curriculum guidelines that emphasize learning using a scientific approach, where the approach steps in the learning process are digging up information through observation, asking, experimenting, then processing data. or information, followed by analyzing, reasoning, concluding and creating. Daryanto in (Hidajat et al., 2018). Therefore, in learning according to Turmudi in (Supriani, 2019) there is a shift in the view of learning from "closed to open" to change from "transmission to participation" and a change from "accepting" too "constructive".

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This shift requires that mathematics learning, which has been dominated by teachers, is sought so that students are given open opportunities. Thus, learning should emphasize the student learning experience. In accordance with the opinion of Beard & Wilson (2006) and Oktaviyanthi (2015) which state that experiential learning utilizes new experiences and learning reactions to experiences to build understanding and transfer knowledge, experiences and attitudes. One learning model that emphasizes experience is the Experiential Learning model.

Online learning activities like this require students to have independence in learning. As the opinion of Nurhikmayati & Sunendar (2020) which states that current learning students are required and must have an attitude of independent learning. In line with the opinion of Sulistiani, Roza and Maimunah (2020) that if students' learning independence is high, then students' problem-solving abilities are good, but if students' learning independence is low, then their problem-solving abilities are not good. Likewise, Damayanty (2016) states that one of the most important factors that students must have is independence in learning, because with learning independence, students will carry out their learning activities with a full sense of responsibility, strong will and have a high discipline attitude so that will have an effect on increased learning achievement. This is in line with the opinion of Sudiana, et.al., (2017) that self-regulated learning is a learning process where each individual can take the initiative, with or without the help of others, in terms of diagnosing learning needs, formulating learning objectives, identifying sources of learning. learning resources (both in the form of people and materials), selecting and implementing appropriate learning strategies for themselves, and evaluating their learning outcomes. Learning independence is a self-awareness to learn by not depending on others and feeling responsible in achieving the desired goals (Hamka, D. & Vilmala, BK, 2019).

From some of the opinions above, self- regulated learning is needed by students in building the concepts and principles they learn. But in fact, not all students have good learning independence, so that student independence in learning needs to be developed. So, in this study, the researcher took the initiative to conduct a study entitled BLENDED LEARNING BASED ON EXPERIENTIAL LEARNING FOR SELF-REGULATED LEARNING FOR MATHEMATICS EDUCATION STUDENTS

II. Review of Review

2.1 Experiential Learning

Experiential learning is a learning where the learning process puts forward a process of change that uses experience as a learning or learning mexpository not only from books or educators, as the findings of several experts who discuss experiential learning Kolb & Kolb (2017), Beard & Wilson (2006), Fallon (2019), Brew (2002), Honey & Mumford (2006), Ashley, Kibbe & Thornton (2014), Mahmudi & Sholihah (2015),

Alice Y. Kolb & David A. Kolb (2017) stated that the experiential learning system is one of the learning innovations that continues to grow because the relationship created between teachers and students will receive information through concrete experience of the subject matter and change it through reflection and conceptualization and then change it again from the information it gains from new experiences. This is in line with the opinion of Beard & Wilson (2006) which states that experience-based learning utilizes new experiences and learning reactions to their experiences to build understanding and transfer knowledge, skills, and attitudes. It is different with Fallon, G (2019) which defines that experiential learning is a a learning process that can create a learning process that can

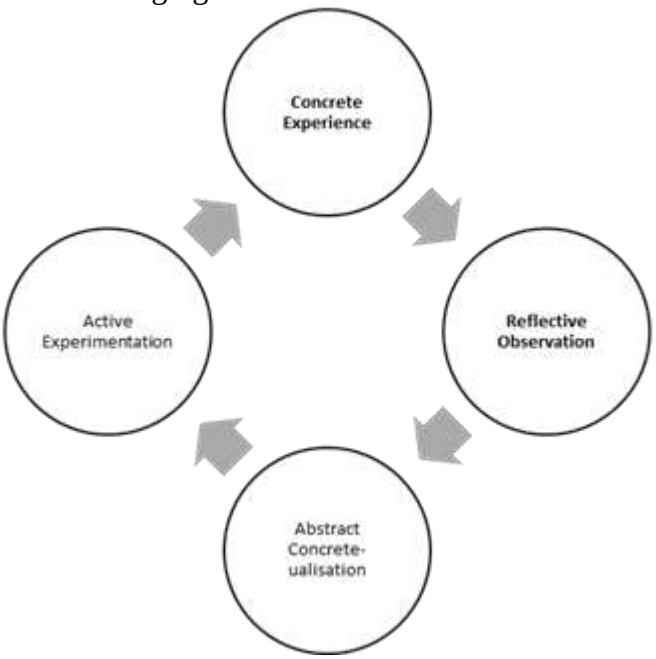
explore students' knowledge insights and can develop meaning so that it will give a deep impression of what they have learned. Meanwhile, Christine R. Brew (2002) highlights that the experiential learning cycle can increase self-confidence, especially for women and their experiences can change a more complex perspective in mathematics to a simpler one. From some of the opinions above, it can be concluded that in the experiential learning model, students are directly involved in the learning experience, students construct their own knowledge of concepts with previous experience and use concepts that have been found by themselves to solve problems.

Peter Honey and Alan Mumford (2006) developed their learning system as a variation on the Kolb model, where learning is the product of a combination of cycle stages of learning. The hallmark of Honey and Mumford's presentation of the style of each stage in the environment or the four stages relates to the loop flow diagram.

a Having an Experience stage 1, and activist (style 1): "here and now", likes making friends, looking for challenges and hands-on experiences, open heart, bored with implementation.
b Reviewing the Experience stage 2 and Reflectors (style 2): "back off", collect data, reflect and analyze, delay in reaching conclusions, listen before speaking, though not fully.
c Concluding from the Experience (conclude based on experience) stage 3 and Theorists (style 3): think logically in terms of through different steps digesting facts into clear theories, the purpose of reason, and rejecting subjectivity and frivolity.
d Planning the next steps stage 4 and Pragmatists (style 4): seek and try new, practical, down-to-earth ideas, enjoys problem solving and quick decision making, tired of long discussions.

Based on the stages outlined above, there are strong similarities between Honey and Mumford's appropriate stages and Kolb's learning styles:

"Activist = Accommodating
"Reflectors = Diverging
"Theorist = Assimilate
"Pragmatist = Converging



Honey & Mumford: Typology of Learnas
Figure 1. *Stages of Experiential Learning Learning*

Steps in above are the stages of the Experiential Learning model. However, in its implementation it is necessary to start with something that is considered challenging for students. The point is to let them experience, reflect, and interpret what they have learned. As with other learning models, in applying the experiential learning model the teacher must improve the procedures so that the learning runs well. Hamalik (2001) revealed several things that must be considered in the experiential learning learning model as follows:

1. The teacher carefully formulates an open-minded learning experience plan that has certain results.
2. Teachers must be able to provide stimulation and motivation.
3. Students can work individually or work in small groups/whole groups in experiential learning.
4. Students are placed in real situations, meaning that students are able to solve problems and not in substitute situations. For example, In small groups, students make cars using pieces of wood, instead of telling how to make cars.
5. Students actively participate in available experiences, make their own decisions, accept the consequences based on those decisions.
6. The whole class retells about what was experienced in connection with these subjects to broaden the learning experience and understanding of students in conducting meetings which will later discuss the various experiences.

In addition to several things that must be considered in the experiential learning model above, teachers must also pay attention to the method of learning through this experience which includes the following three things.

a. Experiential learning strategies use inductive sequences, learner-centered and activity-oriented.
b. The emphasis in the strategy of learning through experience is the learning process and not the learning outcomes.
c. Teachers can use this strategy well in the classroom and outside the classroom.

2.2 Self-regulated learning

Regulated learning is the freedom to learn with students' ability to regulate their own learning activities, on their own initiative and responsibly, without always depending on others. For example: (a) setting learning goals, (b) diagnosing learning needs, (c) monitoring and managing learning needs, (d) viewing difficulties as challenges, (e) self-efficacy (self-concept), as found by several experts who talk about abilities learning independence Anzora, A. (2017) , Fajriyah et al., (2019) , Mahmoodi, MH, Kalantari, B., & Ghaslani, R. (2014) , Purwaningsih (2020) , Hargis and Kerlin (Isnaeni et al. , 2018) , Nurhikmayati & Sunendar, (2020) , Sulistiani, Roza and Maimunah (2020), Damayanty (2016), Sudiana, et.al., (2017), El-Adl, A & Alkharusi, H (2020), Daniela (2015), Diana et al., (2020), Subekti & Jazuli, A. (2020), Rosalin (2008), Pannen et al. (2000), Hadin et al., (2018), Wanti et al., (2017), Zamnah (2017), Pintrict & Groot (Ruswana & Zamnah, (2018), Sumarmo (2010), Sumarmo (2010),

Independent learning according to Anzora, A. (2017) is a learning activity carried out on the encouragement of students' willingness, choice and responsibility. The same opinion was expressed by Fajriyah et al., (2019) that Independent learning is the skill of a student who does learning independently. Meanwhile, Mahmoodi, MH, Kalantari, B., & Ghaslani, R. (2014) which states that learning independence is the ability of a student to try to be independent in exploring learning information other than the learning resources provided by the teacher. In line with the results of Purwaningsih's (2020) research which states that

independent learning allows students to become individuals who are able to solve problems in learning. As for Hargis and Kerlin (Isnaeni et al., 2018) defines learning independence (learning independence) is a process of careful design and monitoring of cognitive processes and affective in completing an academic task, and students who have high learning independence tend to be better in their own supervision. Based on the above understanding, it can be concluded that learning independence is the ability of a person (student) in realizing his will or desire in a real way without depending on others, in this case students are able to determine effective learning methods and are able to carry out learning activities independently.

In current learning, students are required and must have an independent learning attitude (Nurhikmayati & Sunendar, 2020). Independent learning is also revealed by Sulistiani, Roza and Maimunah (2020) that if the learning independence of students is high, then the problem solving ability of students is good, but if the learning independence of students is low, then the problem solving ability is not good. Likewise, Damayanty (2016) states that one of the most important factors that students must have is independence in learning, because with learning independence, students will carry out their learning activities with a full sense of responsibility, strong will and have a high discipline attitude so that will have an effect on increased learning achievement. This is in line with the opinion of Sudiana, et.al., (2017) that learning independence is a learning process in which each student or individual can take the initiative, with or without the help of others, in terms of diagnosing learning needs, formulating learning objectives, identifying learning resources (both in the form of people and materials), selecting and implementing appropriate learning strategies. themselves, and evaluate their learning outcomes.

In their research, El-Adl, A & Alkharusi, H (2020) showed a positive relationship between learning independence with motivation, task value, control and learning confidence, self-efficacy and academic achievement. This is in line with the findings of Daniela's research (2015) which states that learning independence is at the level of achievement achieved by students, and can increase the relationship between motivation and performance. Meanwhile, Diana et al., (2020) formulated several indicators in independent learning, namely 1) independence from others; 2) have self-confidence; 3) behave in a disciplined manner; 4) have a sense of responsibility; 5) behave on their own initiative, and 6) exercise self-control. Meanwhile, according to Subekti & Jazuli, (2020) there are 8 indicators of learning independence, namely as follows: 1) initiative; 2) designing learning needs; 3) set goals; 4) setting strategy; 5) perceive difficulties as challenges; 6) find and utilize the learning resources needed; 7) control the process and evaluate learning outcomes; and 8) the ability to self-regulate. From the results of the research above, it can be concluded that during the learning process students not only accept what is given by the teacher but students must be able to build relationships of what knowledge will be learned. These conditions can lead to independent learning so that students are able to actualize their needs according to their potential.

Teachers have an important role in the process of independent learning. As revealed by Rosalin (2008) that the independent learning process demands teacher dedication, because without the role of a teacher this process will fail. The same thing was expressed by Pannen et al (2000) which emphasized that the main characteristics of independent learning are: not the absence of teachers or fellow students, or the absence of face-to-face meetings in class. According to him, the main characteristic of independent learning is is the development of students' abilities to carry out the learning process that does not depend on the factors of teachers, friends, class and others. Meanwhile Hadin et al., (2018) explained that with independent learning students can combine academic learning and self-

control so that student learning is more motivated to achieve learning goals independently . In addition, Wanti et al. (2017) describe learning independence as playing an important role in learning abstract mathematics, because the many formulas used are absolute. When students do not only study mathematics at school, then students learn independently by doing exercises over and over again at home, students will find it easier to construct their own knowledge. Zamnah (2017) argues that learning independence This is important to have to build one's ability to regulate and control oneself, especially when facing tasks. This is in line with what was expressed Pintrict & Groot (Ruswana & Zamnah, 2018) that the term learning independence in learning is referred to as SRL. Learning independence or SRL is the ability of someone who has knowledge of effective learning strategies and knows how and when to use this knowledge so that students are able to organize themselves in learning.

Rochester Institute of Technology Sumarmo (2010), identified several other characteristics in independent learning, namely: (1) choosing learning objectives, (2) viewing difficulties as challenges, (3) choosing and using available resources, (4) working with individuals others, (5) building meaning, understanding the achievement of success is not enough just with effort and ability but must be accompanied by self-control.

According to Sumarmo (2010), three similar characteristics are contained in the meaning of independent learning are: (1) Individuals design their own learning according to the needs or objectives of the individual concerned; (2) Individuals choose strategies and implement their learning designs: then (3) Individuals monitor their own learning progress, evaluate their learning outcomes and compare them to certain standards. As for learning independence which will be measured in this study as follows:

a. Able to set goals and motivation to learn
b. Able to determine learning needs
c. Able to choose and determine learning strategies
d. Able to have self Efficacy or self concept
e. Able to evaluate Performance

III. Research Method

The research method used is quantitative research, while the design is *quasi-experimental,* namely *nonequivalent control group design.*

$$\begin{array}{ccc} O_1 & X & O_2 \\ \hline O_3 & & O_4 \end{array}$$

$O_1 \; dan \; O_3$: It is a *self-regulated learning ability before being given a blended learning* treatment based on *experiential learning*

O_2 : It is a *self-regulated learning ability after being given a blended learning* treatment based on *experiential learning*

O_4 : It is a *self-regulated learning ability* that is not treated with *blended learning* based on *experiential learning*

Table 1. the relationship between the variables x and y

ability	Experimental class (E)	Control Class (C)
	blended learning based on *experiential learning*	*blended learning*

IV. Result and Discussion

4.1 Population Policy During Turki Utsmani 1512-1566 M

Based on the data that has been obtained, the independence of student learning through *blended learning* based on *experiential learning* is described in Table 2 as follows:

Table 2. Description of Independent Learning

Score	$\bar{x}$	**SD**
Early Abilities	32.45	7.504
Final Ability	42.31	8,893

In more detail, the comparison of the initial and final ability scores is illustrated in the bar chart, as follows:

Figure 1. *Average score of learning independence*

In Figure 1 it can be seen that there are differences in the average initial and final abilities before and after learning *Blended learning* based on *experiential learning.* Based on the diagram, *experiential learning* has a positive impact on students' justification abilities. It can be seen that before *blended learning* based on *experiential learning*, the average student justification ability was 32.45, but after *blended learning* based on *experiential learning* there was an average increase in justification ability of 42.31. From the results of descriptive statistics, we can conclude that the effect of *experiential learning* is able to make a positive contribution to student learning independence.

So that the conclusions from descriptive statistics can be strengthened, it is necessary to test the hypothesis. So the first step in testing the hypothesis is to do a prerequisite test with a normality test. The results of the normality test are described in the following table.

Table 3. Normality test

	Kolmogorov-Smirnov [a]			Conclusion
	Statistics	df	Sig.	
Initial Score	.256	26	.000	Data is not normally distributed
Experiment	.191	26	.925	Data is not normally distributed

a. Lilliefors Significance Correction

Prerequisite testing shows that the comparison test of the average student learning independence uses non-parametric statistical tests. So that the hypothesis testing uses the *Wilcoxon test.* The results of testing the learning independence hypothesis are described in Table 1.3 as follows.

Table 4. Wilcoxon Test Results

	Post - Pre
Z	-3,857 [b]
asymp. Sig. (2-tailed)	.000

a Wilcoxon Signed Ranks Test
b Based on negative ranks.

The results of statistical hypothesis testing using the Wilcoxon test with a p-value of 0.000 < α =0.05, then the research hypothesis is accepted, meaning that there is an increase in students' mathematical justification through *experiential learning.* So, it can be concluded that the effect of *experiential learning* can increase student learning independence.

After doing descriptive and infrensial analysis, we can conclude that there are differences in the increase in student learning independence which is the effect of *experiential learning.* The results of the analysis also show that the difference in increasing learning independence is the effect of *experiential learning* where in *experiential learning* there are several stages as follows: (a) The teacher formulates an open-minded learning experience plan , (b) The teacher provides stimulation and motivation , (c) Students work individually or work in groups in experiential learning , (d) Students are placed in real situations , (e) Students actively participate in the available experiences, make their own decisions, accept the consequences based on these decisions , (f) Overall students retell about what they learned Experienced, So that at the stages of *experiential learning,* the students' justification ability increases significantly.

Experiential learning which has the effect of increasing student learning independence is in line with Vygotsky's concept of *Zone Proximal Development* (ZPD) and *scaffolding.* Where there are stages of formation of the stages of student knowledge and during the learning process *scaffolding* (support) is needed in learning.

V. Conclusion

Through experiential learning, students' learning independence is better. The result of analysis shows that students' mathematical justification skill of Junior High School gives positive contribution through experiential learning.

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