

The effectiveness of Activity-Based Learning to Improve Students' Self-Directedness in Learning

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Abstract— The purpose of this study is to find out the differences between the implementation of ABL model and the conventional model in improving students' self-directedness in learning. This quantitative research used the quasi-experimental design. The research population consisted of 122 undergraduate students of Civil Engineering taking the Construction Management course in the academic year of 2017/2018. The study participants were students from two out of four Construction Management classes, taken by random sampling technique. The experimental group and control group consisted of 28 students each. Results showed that the implementation of activity-based learning (ABL) method exerted a significant effect on student self-directedness in learning. The ABL method was, in fact, more effective in improving self-directedness than the conventional model.

Keywords: *Activity-Based Learning (ABL), Self-Directed Learning, Construction Management*

I. INTRODUCTION

Higher education becomes one of the centres of various intellectual activities, where each student expects to exhibit identifying characteristics of an educated person. Students are also required to think creatively and critically in addressing the issues arising in society. These demands make students position themselves as creative and self-directed learners (Liu and Nwetter, 2004). However, there is disappointment from the construction industries. They considered that the lack of work ethic, communication, problem-solving skill, leadership, decision-making, teamwork, and others are factors that influenced the Civil Engineering graduates who have low competencies. (Wena, Rahardjo, and Priyono, 2017). One of the factors that influenced the low quality of higher education graduates is the low quality of learning. The role of current instructional process acts as only a means of delivering theoretical knowledge. Kotler and Fox (1995:414) stated that there are six keys that determined the standard of a university; instructions, library resources, academic advising, faculty meeting, job placement and extracurricular activities. Based

on the six dimensions, the most crucial factor is the quality of learning. If the quality of instruction is poor, the whole aspects will get the negative effect.

Self-directedness in learning is a key factor in achieving learning success (Field, Duffy, and Huggins, 2015). It is a state where students learn autonomously, not relying on others. Self-directed students are full of determination and feel a responsibility to overcome their learning problems. The self-directedness will happen if students can closely control and evaluate their learning activities, plan improvements, and actively participate in the learning process (Fry, Ketteridge, and Marshall, 2009).

Self-directed learning is the students with their self-awareness that involved in learning activities to achieve the learning outcomes. Meyer (2010) pointed out that, to promote self-directedness in students, teachers should actively encourage them to build their independent learning skills. Self-directedness in learning, in fact, depends on the productive interaction between students and teachers. According to Francom (2010), there are some factors that contributed to the self-directedness in learning are student-teacher interaction, goal setting, learning implementation plan, self-evaluation, and utilization of metacognition, motivation, and domain knowledge. Williamson (2007) and Ricard (2007) stated that the positive relationship between teachers and students, the provision of learning resources, and the delivery modes give influences to the use the self-directed method in the students' learning.

The instrument that used to measure the self-directed learning skill is The Self-Rating Scale of Self-Directed Learning (SRSSDL). The SRSSDL have five important points; learning activities, learning strategies, interpersonal skill, awareness, and evaluation (Williamson, 2007). Before the implementation, this type of measuring tool should be tried before to determine its level of validity and reliability. The level of self-directedness is evaluated based on a certain number of points. It is obtained from the subject; the lower the score, the lower the level of self-directedness.

The majority of science and technology lessons today emphasizes content-based instruction in class and laboratory

(Goodhew, 2010). Courses are delivered through teacher-centered and accompanied by conventional content-based textbooks and handbooks. The teacher-centered instruction that put the students in a passive mode will make a low achievement and the lack of self-directedness in learning.

According to Fry, Ketteridge, and Marshall (2009), to minimize the weakness of conventional instructions like passive learning. The students should have more chances to communicate and join with the others actively. In improving the students' interaction and participation effectively and actively, the use of an advanced instructional approach should be more developed. The activity-based learning (ABL) is one of the applicable approaches that suitable for the Civil Engineering's characteristics. Therefore, the use of a single approach cannot conduct the efficient learning process. As a result, activity-based learning (ABL) is developed.

ABL is a learning method/approach that focused on developing the students' participation actively in theories or concepts learning by using various types of activities and experiences in diverse learning environments in the campus. It focuses on the students' active participation and creativity development are concerned in ABL. Then, the good balance between emotional, mental, physical and intellectual activities are important things that needed for ABL. For the students' learning outcome, ABL needs a good connection from learning the outcome of skills, knowledge, and attitudes. The role of the holistic development of the student is encouraged in ABL because the students need to be intelligent, well-behaved and experienced.

Based on previous studies and empirical observations, sometimes the ABL approach is neglected in the instructional processes by engineering fields. Apparently, many teachers have not understood that the implementation of ABL can make the students as active participants from passive recipients of knowledge because the development of cognitive, affective and psychomotor domains can develop concurrently. The students can also achieve higher-order performance and assist them in a further approach to learning. It means the students consider the conceptualizing concepts or facts (orientation meaning) process is learning (Marton & Saljo, 1984). We can conduct effective learning if there is a good environment for active learning. This statement is in line with Petra's (2014) as he stated that "for effective teaching, learning must occur".

ABL as a learning approach requires an appropriate specific learning model/method. For this reason, experiential learning has been chosen. Experiential learning refers to a learning process from a collaboration of comprehending and changing experience (Holzer & Andruet, 2000; Jayaraman, 2014). It is an instructional model based on Kolb's theory. It focuses on learning as a process in which knowledge has been developed by the transformation of experience (Kolb, 1984). The experience learning focuses on the action and thinking as a connection in the transformation of experience. The experiential learning has a four-stage learning cycle in. They are reflective observation, abstract conceptualization, active experimentation, and concrete experience.

Several studies have suggested that the students' learning outcomes can improve the implementation of experiential learning significantly (Kolb, 1984; Jayaraman, 2014; Downey, 2013; Paolini, 2015). Furthermore, the involvement of experiential learning in the ABL is expected to improve the students' knowledge, attitudes/soft and technical skill (Kolb, 1974; 1984). It is expected to improve not only learning achievement but also self-directedness in learning.

In fact, the quality of learning is associated with the instructional process. The instructional process is closely related to the method used. Without the use of an instructional method/model in accordance with the characteristics of students and field of study, the instructional process cannot take place optimally. Based on the researchers' close observation, the ABL approach is rarely used in the instructional process in Construction Management classes. For a reason above, this study intended to find out significant differences between the implementation of ABL model and the conventional model in improving students' self-directedness in learning.

II. RESEARCH METHOD

This quantitative research employed the quasi-experimental research design. It was conducted at Universitas Negeri Malang (State University of Malang) in the even semester of 2017/2018. The research population consisted of 122 undergraduate students of Civil Engineering taking the Construction Management course in the academic year of 2017/2018. The study participants were students from two out of four Construction Management classes, taken by random sampling technique. To ensure the equality of both groups in terms of self-directedness level, a self-directedness questionnaire in learning was administered. The results found that there was no difference significantly. It referred to the experimental and control group were equivalent. Each group consisted of 28 students.

The non-test method is used to collect Data of self-directedness in learning, i.e. a questionnaire with closed-ended questions. The questionnaire was developed referring to the variable of self-directedness in learning; 10 indicators were developed into 30 items. The validity of the questionnaire was examined by factor analysis and item analysis. The reliability test used was Cronbach's Alpha.

Based on the validity test, 25 out of 30 items were valid. These 25 items represented the indicators of self-directed learning and were used to collect the data. The Cronbach's Alpha coefficient was 0.75; an α value of above 0.70 suggests a reliable questionnaire.

This research was carried out in three successive stages, namely (1) survey and exploration; (2) teaching material preparation based on the ABL method; and (3) experimental research to investigate the effectiveness of the method in improving self-directedness in learning.

Puspita (2012) categorized learning activities into five categories in Table 1.

Table 1. Activity Classification

Interval Value	Category
85% - 100%	Very Active
65% - 84%	Active
55% - 64%	Relatively Active
35% - 54%	Less Active
0% - 34%	Inactive

The independent samples were used to test the hypothesis. It is used to find out the difference in the students' the self-directedness in the control group and experimental group. The t-test was used as follows (Sudjana, 2005).

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

where:

- X₁ = average of experimental group samples
- X₂ = average of control group samples
- S₁ = standard deviation of experimental group
- S₂ = standard deviation of control group
- n₁ = number of experimental samples
- n₂ = number of control samples

In the hypothesis testing, the significance level (α) used was 0.05 or 5%. The decision making in the hypothesis test was based on the following the criteria: if Sig. > 0.05, the null hypothesis (H₀) is accepted, and the alternative hypothesis (H_a) is rejected. To determine the normality data the Kolmogorov-Smirnov test was conducted. The result showed that the experimental group obtained a p-value = 0.208 > α, the control group obtained a p-value = 0.687, meaning both sample groups were derived from normally distributed populations. To assess the homogeneity variance the Levene's test was conducted. The F value with equal variance assumed and a probability level of 0.150 was 6.349. A probability level of > 0.05 indicated that both variances were exactly the same.

III. RESULTS

The pre-test results showed that the initial self-directedness of students in the control class (=69.6429) was lower than that in the experimental class (=70.8571) (see Table 2). The two groups' pre-test score is in "good" category. The average post-test scores increased; 81.2143 for the experimental group (gain score=10.3572) and 72.8214 for the control group (gain score=3.1785).

Table 2. The Average of Pre-Test, Post-Test, and Gain Score

Class	Pre-test	Post-test	Gain Score
E	70.8571	81.2143	10.3572
Control	69.6429	72.8214	3.1785

Next, a hypothesis test was done to decide to find out the significant difference in pre-test and post-test. The null hypothesis' result revealed that there were no significant differences between the implementation of ABL model and the conventional model in improving students' self-directedness in learning. Table 3 shown the the t-test's results.

Table 3. T-Test Results

		F	Sig	T
X ₁	Equal variances assumed	6.349	.015	9.608
	Equal variances not assumed			9.608

- H₀ = both population variances are identical
- H₁ = both population variances are not identical

Decision Making:

- H₀ is accepted if probability > 0.05
- H₁ is rejected if probability < 0.05

Decision:

As shown in Table 3, the F value with equal variance assumed and a probability level of 0.150 was 6.349. A probability level of > 0.05 indicated that both variances were exactly the same. Due to the identical variances, equal variance assumed was used to compare the average population and t_{test}.

Hypothesis:

- H₀ = There were no significant differences between the implementation of ABL model and the conventional model in improving students' self-directedness in learning.
- H₁ = There is a significant difference between the implementation of ABL model and the conventional model in improving students' self-directedness in learning

Decision:

The t_{value} with equal variance assumed was 9.608 with a probability level of 0.000. Since the probability was <0.05, H₀ was rejected, and H₁ was accepted. In other words, there was a significant difference between the implementation of ABL model and the conventional model in improving students' self-directedness in learning.

IV. DISCUSSION

Regarding the students' self-directedness, the use of the ABL model had an average score of 70.8571, higher than the use of the conventional model, i.e. 69.6429. On average, the self-directedness of students in the experimental group increased by 10.3572, while that of students in the control group increased by only 3.1785. Based on the t-testing, the value of the equal variances assumed was 9.608 with a probability level of 0.000. So, a significant difference between the implementation of ABL model and the conventional model in improving students' self-directedness in learning was found.

The results of this study suggested that the implementation of ABL was more effective in improving student self-directedness than the use of the conventional model. This happened because students could learn actively through various activities presented in blended environments inside and outside of campus.

One of the variables contributing to the success of ABL in improving self-directedness is experiential learning. According to Mardana (2006), the stages of the experiential learning model emphasise science experiences that related to daily life. This model suggested being implemented in various settings inside and outside campus together with the activity-based learning. The inclusion of experiential learning in ABL will promote productive interactions between teachers and students. Productive student-teacher interactions enhance self-directedness in learning Meyer (2010). The blended learning as an important role in the ABL's implementation. Because blended learning can support the students' cognitive, affective and psychomotor domains in learning (Thorne, 2013; Kaye, 2013; Bersin, 2013; Clark, 2013). Structured cognitive, affective and psychomotor activities will affect the improvement of self-directedness in learning. The experiential learning and blended learning combination in ABL are illustrated in Figure 1.

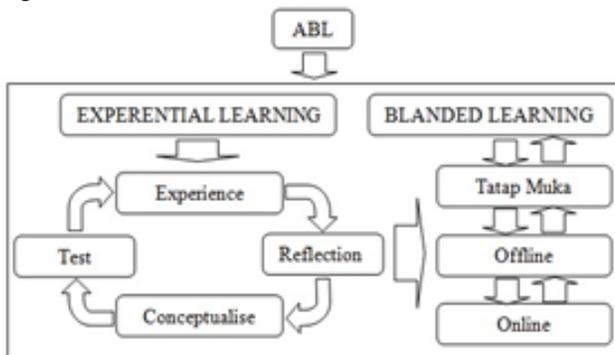


Figure 1. ABL Approach

The result of this research corresponds to Shah and Rahat's statement (2014). It stated that the implementation of ABL encourages students to participate actively in the learning process. It means the students need to comprehend scientific concepts and apply them in daily activities. Active participation indicates self-directedness in learning. As stated by Field, Dufy and Huggins (2015) that one of the indicators of self-directed learning is when students are

proactive, motivated and responsible for learning. Ravi and Xavier (2007) further pointed out that ABL gives students the freedom and opportunity to devise their own ways of learning.

According to Awasthi (2014), the quality of learning can be improved significantly by using ABL, if there is a qualified teacher that fully understand the concepts of ABL. ABL also needs a lot of money and time for its implementation. Harfield, Davies, Hede, Panko Kenley (2007) argued that in achieving higher-order performance (high-level problem-solving skills) the students need to be involved actively in real life experience. ABL can improve students' learning achievement and active participation in business (Ranganath, 2009). Khan et al. (2012) said that the students' high-order thinking skills could also develop in the ABL approach. Addy, Craft and Fletche (2012) concluded that the ABL model is beneficial in improving student achievement, active involvement and self-directedness in learning.

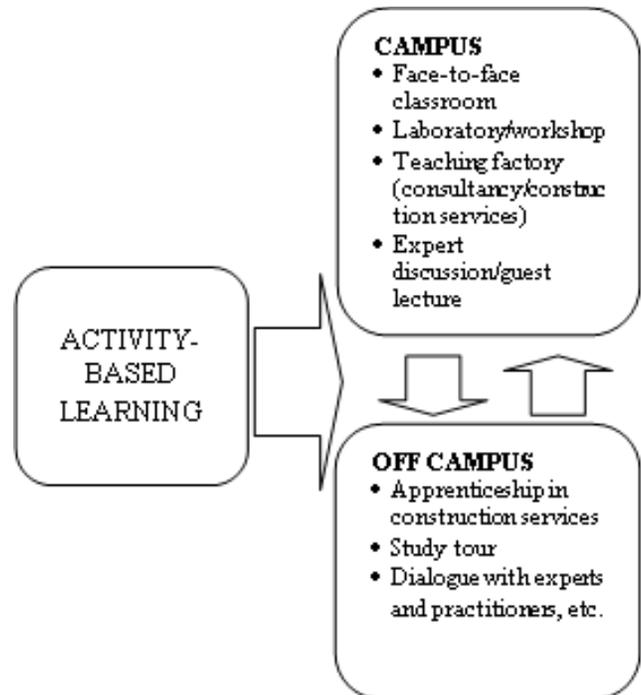


Figure 2. Activities Based Learning in Campus

Learning on the outside of campus like in the workplace environment is very important for the development of the students' skills. Because it allows them to take a realistic view of the work world. Students can compare learning in the school and the real-life work. Learning in the workplace is named Work-Based Learning (WBL). In WBL, the real experiences related to the skills, theories, and concepts are provided for the students (tacit knowledge) (Goodhew, 2010). Since lessons are delivered in different settings (in and off campus) and formats (face-to-face instruction, offline and online learning), the process of grasping and transforming experience in learning can occur comprehensively.

In self-directed learning, students should closely control and evaluate their learning activities, and then plan improvements to get better learning achievement. In self-directed learning, the learners are willing to learn by themselves and interested in learning. Woolfolk (2009) revealed that knowledge, motivation and self-discipline are factors that can influence independent learning. Self-directed learners are confident, proactive and responsible for the tasks given. This can make students ready to learn throughout life without much need for guidance and to adapt during the learning process. In fact, self-directedness greatly contributes to improving student problem-solving skills.

V. CONCLUSION

The results of hypothesis testing and discussion have led to the following conclusions. The implementation of activity-based learning (ABL) method exerted a significant effect on student self-directedness in learning. This was supported by the significance level of 0.00. The significance level' result described there was a significant difference between the implementation of ABL model and the conventional model. The implementation of the ABL method by using experiential learning in a blended environment could active the students' cognitive, affective and psychomotor domains that encouraged them to learn actively and comprehensively.

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