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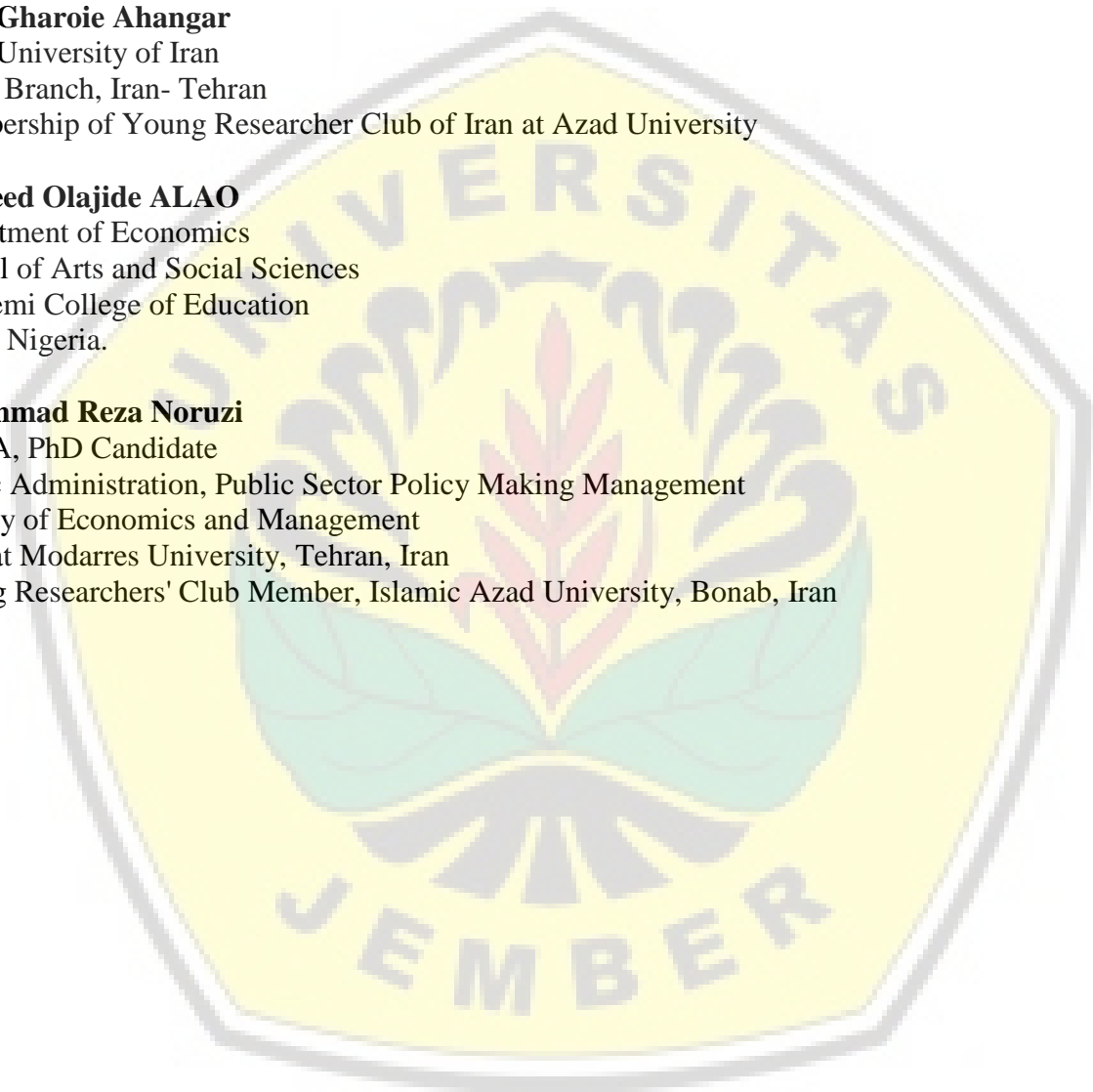
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## Influence of Problem Based Learning by Using Mind Mapping Observed by the Prior Knowledge Level of Students Learning Outcomes in the Social Studies

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### ABSTRACT

*This study was aimed to determine the effect of Problem Based Learning Model by using Mind Mapping on the students' learning outcomes, the influence of the initial knowledge level on the learners' learning outcomes, and to determine the effect of Problem Based Learning Model by using Mind Mapping in terms of the level of prior knowledge of the participants' learning outcomes. This type of research was a quasi-experimental study. Determination of respondents used cluster random sampling. To test the requirements of data analysis, homogeneity and normality test, hypotheses test using One-Way-Anova and Two-Way-Anova analysis were used. The results showed that 1) there was a significant effect of the Model Problem Based Learning to use Mind Mapping to the learning outcomes of students with significance (sig.) = 0.023 <= 0,05. 2) There was a significant influence of the level of initial knowledge (high, medium, low) on students' learning outcomes i.e. (sig.) = 0,000 <a = 0.05. 3) there was a significant influence model of Problem Based Learning by using Mind Mapping in terms of the level of initial knowledge of student learning outcomes was the value of sig. = 0.007 <0.05, so the hypothesis was accepted. Whereas for the amount of initial knowledge in the category of low, medium, and high, equal to the learning outcomes of learners.*

**Keywords:** *Problem Based Learning, Mind Mapping, Prior knowledge level, learning outcomes*

## 1. INTRODUCTION

Problem-Based Learning (PBL) emerged in the late 20th century, precisely popularized by Howard Barrows. This model emerged as a result of research on the reasoning ability of medical students at McMaster Medical School in the 1970s (Amir, 2015: 12). The essence of PBL is to present problematic, authentic and meaningful situations to learners, which can serve as a springboard for investigation (Arends, 2008: 41). Meaning problem-based learning teaches learners to start learning activities with a problem to be solved, resulting in new knowledge.

The ability of learners in PBL is closely related to "The 2012 National Association of Colleges and Employers (NACE) Job Outlook Survey" (NACE, 2012), which reveals ten skills i.e., cooperation, communication skills, decision making skills and problem solving, information processing skills, task-setting skills, data analysis skills, learning skills, software skills, report writing skills, and other people's skills

Alternative learning methods that allow students to develop critical thinking skills (reasoning, communication, and connections) in solving problems is Problem Based Learning (PBL) (Rusman, 2011: 229). PBL is a set of teaching models that use problems as a focus for developing problem-solving skills, materials and self-organization. (Hmelo-Silver, 2004) (Serafino & Cicchelli, 2005). In the PBL class, there is also effective communication and learners are able to collaborate with other learners in doing experiments (Cennamo, Brandt, Scott, Douglas, McGrath, Reimer & Vernon, 2011). PBL helps students to develop communication skills, work in collaboration and develop critical thinking (Bilgin et al., 2009: 153).

In relation to the achievement of improving the quality of education expected in the learning process, educators must have academic qualifications, competencies (including pedagogic, personality, social and professional) certification of educators, physically and mentally healthy, and have the ability to realize the goals of national education (Pidarta, 2009: 69). Learning achievement is the main benchmark to know the success of one's learning. Learning achievement is the level of knowledge to what extent the child received material (Rusman, 2012: 124).

## 2. THEORITICAL REVIEW

### *Problem Based Learning (PBL)*

Problem-based learning is a learning model that exposes learners to the challenge of "learning to learn" (Duch as cited in Amir, 2015). PBL can construct real problems to find solutions (Finkle & Torp, Rusijno as cited in Rianto, 2009). A set of teaching models that use problems to develop problem solving skills, materials, and self-regulation (Hmelo-Silver, 2004; Serafino & Cicchelia, 2005 as cited in Paul Eggen Dond Kauchak, 2016). Problem-based learning is a student centered method and in teaching involves issues on topics to be studied (Yelland, as cited in Etherington, 2011). PBL is a learning model that leads to significant contextual situations in the real world, providing instructions for learning (Folashade & Akinbobola, 2009).

The essential features of the Problem Based Learning model (Brook Martin in Sadia, 2006) are; learning objectives are designed to involve learners in problem-solving patterns, issues must bring up the concepts or principles that are relevant and real, the presentation of the problem, the educator acts as a tutor and facilitator.

In practice, PBL has three characteristics as depicted by Scott and Laura (Eggen, Kauchak, 2016: 307) namely; *First*, the lesson starts with a problem and solves the problem; *Second*, learners are responsible for solving problems; *Third*, the educator guides the students in the problem solving process. This characteristic is important and demands highly professional skills and considerations to ensure the success of the Problem Based Learning lesson.

Problem Based Learning in the classroom leads to learners with conceptual problem-solving skills and through scientific procedures. According to Eggen, Kauchak, (2016: 310-311) there are two levels of learning; *First*, learners must solve one specific problem and understand the material; *Second*, learners should be able to develop problem-solving skills.

### *Mind Mapping*

Mind Mapping is a method of learning the concepts found by Tony Buzan. This concept is based on how our brain works in storing information. Mind Mapping uses the brain's ability to visual recognition to get maximum results with a combination of colors, images, and curved branches. Mind Mapping is more visually

stimulating than traditional linear and single-color recording methods. This will make it easier for us to remember all the information contained in the Mind Mapping (Buzan, 2006: 9). Warseno and Kumorojati (2011: 81) suggested that Mind Mapping is said to fit the brain's natural working because it uses the principles of brain management.

There are five functions of mind mapping as proposed by Tony Buzan (2011: 5), namely: 1) Give a comprehensive view on the subject matter or a large area. 2) Allow us to plan routes or make choices and know where we are going and where we are. 3) Collect large amount of data in one place. 4) Encourage problem solving by letting us see new creative breakthroughs. 5) Fun to see, read, digest, and remember.

#### *Prior Knowledge*

Prior Knowledge is one of the characteristics of learners. The diversity of backgrounds and experiences causes each prior knowledge not to be the same. Those with high level prior knowledge can learn better than their average and low-skilled friends. Prior knowledge that learners gain before learning affects the learning process significantly. If prior knowledge is good, educators and learners are easier to interact in a positive way to facilitate learning. Moreover, in physics learning there are interrelated and increasingly complex levels of knowledge in the future. Those with a high initial ability more easily remember the information they have acquired and more quickly understand the material that has been learned.

According to Arends as cited in Nur (2004: 10) prior knowledge is a collection of prior knowledge individuals acquired throughout the course of their lives.

In the view of constructivism, prior knowledge has an important and strategic role in the learning process of learners. There are five principles of learning and teaching that are the basis for constructivism-based approaches: First, learners have prior knowledge. Second, learning is the process of instruction. Third, learning is a change in the conception of the learner. Fourth, the process of constructing knowledge takes place in a certain social context. Fifth, the learner is responsible for the learning process (Widodo, 2010: 46).

In this case, there are seven types of prior knowledge which can be used in processing new knowledge i.e., arbitrary meaningful knowledge, analogy knowledge, superordinate knowledge, coordinate knowledge, subordinate knowledge, experiential knowledge, cognitive Strategy (Emnoeh, 2011: 32-34).

From the above discussion of prior knowledge held by learners, there are various types and each learner has different prior knowledge in following their learning activities. Educators need to understand the importance of prior knowledge in the learning process and provide opportunities for learners to recall what they understand or know. Harsono (2006:2) found out how to enable prior knowledge i.e., via brain storming, Know-Want-Learn strategy and cognitive mapping.

#### *Learning outcomes*

Learning outcomes are the realization or division of potential or capacities possessed by a person (Sukmadinata, 2009: 102-103). John M. Keller's opinion on learning outcomes as the output of a variety of input processing systems in the form of information (Abdurrahman, 2009: 38). Learning outcomes are the changes that occur in the students themselves (Susanto, 2013: 5) Changes in learners' behavior due to learning (Purwanto, 2011: 46). Thus the learning outcomes are the abilities that the learners have after receiving their learning experience.

### **3. RESEARCH METHODS**

The research method used is quasi-experimental method. The selected sample was divided into two groups which were then treated with different teaching methods. In the experimental group the material was presented via Problem Based Learning (PBL) using Mind Mapping, while in the control group students were presented the material using Problem Based Learning (PBL) without using Mind Mapping. In both classes, a cognitive ability test was given. To find out the initial state, the researchers' used repeat value for learners. The research design used is 2 x 2 factorial design.

The population in this study are students of class VIII MTsN Sukowono academic year 2016-2017 with the number of 80 students and divided into two study groups, namely class VIII A amounting to 40 students and class VIII B amounted to 40 Learners. As for this research, we take sample of class VIII in MTsN Sukowono academic year 2016-2017.



In this study, researchers used a sampling technique in the form of cluster random sampling. Cluster random sampling is a sampling technique of the area used to determine the sample if the object to be researched or the source of data is very broad, for example residents of a country, province or district.

The sampling technique such as cluster random sampling is often used through two stages, i.e., the first stage determines the sample area and the second stage determines the people who are in that area were brought in sampling.

The determination of the control group and the experimental group of the two classes used for the study class used cluster random sampling with homogeneity test. After homogeneity test, we selected the experimental group in form of the students of class VIII A of 40 students with details of 23 participants of male students and 17 female students and as a class control Class VIII B students amounting to as much as 40 participants with the details of 20 male learners and 20 female students.

In this research, the validity test used is the content validity test. Measurement of validity in this study using the Bivariate Pearson correlation formula and Correlated Item-Total Correlation using Statistical Package for Social Sciences (SPSS) version 22 for windows.

Before applying the research, the validity of the items was tested which aims to determine the level of the discriminant validity of the items/scales. Whereas to test the validity using the value of pre-test, here is the result of validity test conducted by researchers on try out test.

In our research, data collection is done by the method of documentation and test technique. While the data analysis carried out with the following steps:

1. *Normality test:*

Normality test is done to determine whether the data is stacked normally distributed or not. In this study, normality test using SPSS version 22 of data processing program with one sample test of Kolmogorov Smirnov normality. The test criterion is if the value of Sig. (Significance) or probability value  $<0.05$  then the distribution is not normal, whereas if the value of Sig. (Significance) or probability value  $>0.05$  then the distribution is normal (Santoso, 2009: 186).

2. *Homogeneity test*

Homogeneity test is intended to test the similarity of some parts of the sample, so that generalization of the results to the whole population can be done. In this study, homogeneity test using SPSS 22 (Statistical Package for Social Sciences) data processing program with Levene test or t-test.

The test criterion is if the value of Sig. (Significance) or probability value  $<0.05$  then the data comes from populations having unequal variance, whereas if the value of Sig. (Significance) or probability value  $>0.05$  then the data comes from populations that have the same variance (Santoso, 2009: 186).

#### 4. RESEARCH RESULT

##### *Influence of Problem Based Learning Model by Using Mind Mapping on Learning Outcomes*

Based on the research by using One-Way ANOVA analysis (1 point ANOVA analysis) can be obtained significance value (sig.) = 0,023  $<a = 0,05$ . This means that the statistical hypothesis ( $H_0$ ) is rejected and ( $H_a$ ) is accepted. It can be concluded that there is influence of Problem Based Learning Model by using Mind Mapping on Learning Outcomes of learners in MTsN Sukowono Class VIII Year Lessons 2016-2017. It can be seen from the average value of experimental class after applied Model Problem Based Learning by using Mind Mapping that is equal to 83.05. As for the average value of control class after the applied Model Problem Based Learning method without using Mind Mapping that is equal to 79.1, so the hypothesis is accepted.

Based on the research that has been done, it can be seen that with the implementation of Problem Based Learning Model by using Mind Mapping, it can affect student learning outcomes. Learning activities using problem based learning has several advantages (Hamdani, 2011: 88), that learners are involved in learning activities so that knowledge is fully absorbed properly, learners are trained to be able to work with other learners, and learners can get settlement from various sources.

From the explanation it seems clear that with the application of problem-based learning learners require to play an active role in the learning process conducted in the classroom. When the application of Problem Based Learning Model by using Mind Mapping on learning will trigger learners to be active in learning activities undertaken. This is because with the application of Problem Based Learning Model by using Mind Mapping learning becomes more interesting.

This is because by using Mind Mapping in learning to give some benefits, according to Buzan (2009: 54-130) mind mapping can be useful to (1) stimulate the functions of the left and right brain in synergy, (2) free yourself from all bondage rules when (4) making a plan or story frame (5) developing an idea, (6) creating a personal goal plan, (7) Starting a new business, (8) summarizing the contents of a book (9) flexibility (10) improving focus and attention, (11) improve understanding, and (12) making it fun and easy to remember.

Therefore with the implementation of Problem Based Learning Model by using Mind Mapping, the learning outcomes of students of class VIII in MTsN Sukowono can get affected. So, the application of Problem Based Learning Model by using Mind Mapping can provide space for learners to meet their needs so that learners will have a high motivation in learning. Implementation of Problem Based Learning Model by using Mind Mapping in VIII classroom students in MTsN Sukowono not only has an impact on the learners' learning outcomes but also impacts on learners' activity in learning.

#### *Influence of Prior Knowledge Level on Learning Outcomes*

Based on the research using One-Way ANOVA analysis (1 point ANOVA analysis) we can get the significance value (sig.) = 0.000 <math>\alpha = 0.05</math>. This means that the statistical hypothesis (Ho) is rejected and (Ha) is accepted. It can be concluded that there is influence of Prior Knowledge level on learning outcomes of learners in MTsN Sukowono Class VIII Year Lessons 2016-2017.

Based on the research that has been done, it can be seen that the level of Prior Knowledge can affect student learning outcomes. *Prior knowledge activation has strong facilitative effects on learning* as per Chi, de Leeuw, Chiu, and LaVancher (1994) (Sandra Wetzels at.3).

The activation of Prior Knowledge will be influential in learning, Prior Knowledge owned by learners can give understanding and improvement of learning result. Prior Knowledge can directly facilitate the learning process and leads to the results of better learning. And indirectly, Prior Knowledge can optimize the clarity of lesson materials and improve the efficiency of time spent learning.

Learners who have a high level of prior knowledge can easily remember more of the information obtained and more quickly understand the material learned. Educators need to know how fast and how far Prior Knowledge help learners so they can plan and predict learning patterns. In this case, the researchers proposed that Prior Knowledge also influences the learning outcomes of students class VIII MTsN Sukowono academic year 2016-2017.

#### *Influence of Problem Based Learning Model by Using Mind Mapping Judging from Prior Knowledge Level on Learning Outcomes*

Based on the research by using Two-Way ANOVA analysis (analysis of two paths) it can be seen that there is Influence of Problem Based Learning Model by Using Mind Mapping Judging from Prior Knowledge to Student Learning Outcomes in MTsN Sukowono Class VIII Year Lessons 2016-2017. For class value (Application Model) with sig value. = 0.000 <math>< 0.05</math> means that there is difference of learning result of student in class VIII. A MTsN Sukowono with application of Problem Based Learning model by using Mind Mapping on experiment class with control class applying the Problem Based Learning model.

For the criterion value (Prior Knowledge) with sig value. = 0.000 <math>< 0.05</math> means that there are differences in students' learning outcomes in grades VIII.A and VIII.B MTsN Sukowono by category of learners who have Prior Knowledge with high, medium and low category. And for Model \* criteria value with sig value. = 0.007 <math>< 0.05</math> means that there is an effect of Problem Based Learning model using Mind Mapping in terms of Prior Knowledge low, medium, and high, to the learning outcomes of students on the subjects of social studies in MTsN Sukowono Class VIII Year Lessons 2016-2017.

This means that the statistical hypothesis (Ho) is accepted and (Ha) is rejected. It can be concluded that there is an influence model of Problem Based Learning by using Mind Mapping in terms of Prior Knowledge on student learning outcomes. The influence of Problem Based Learning model by using Mind Mapping from Prior Knowledge to student learning outcomes in MTsN Sukowono Class VIII Year Lesson 2016-2017 shows the existence of dependent factor so that learners knowledge increases of learning results. So, from the results of the analysis, it can be seen that with the implementation of Problem Based Learning model using Mind Mapping in terms of Prior Knowledge gives a greater impact on the results of learning in class VIII MTsN Sukowono.

Based on the research and data analysis conducted it can be seen that the difference mean learning outcomes of learners in class VIII MTsN Sukowono in the low category and the results of learning in the medium category is -9.6. This shows the mean of learning outcomes of learners in the lower categories smaller than 9.6 than the learning outcomes of learners in the medium category. Differences mean learning outcomes of students in class VIII MTsN Sukowono in the low category and the results of learning in the high category is -20.8824. This shows the mean of learning outcomes of learners in the lower 20.8824 smaller category than the learners learn in high category.

While for difference mean learning result of learners in class VIII MTsN Sukowono in medium category and result of study in high category that is -11.2824. This shows the mean of the learning outcomes of learners in the medium category is 11.22824 higher than the learning outcomes of learners in the high category. This shows that there are differences in learning outcomes of students VIII MTsN Sukowono based on Prior Knowledge low, medium, and high.

In learning, Prior Knowledge plays a very important role because what has been known by the individual will in some degree affect what they learn. Prior Knowledge is instrumental in the process of assimilating and accommodating knowledge. So it can be said that Prior Knowledge in the learning process can help learners build a bridge between the knowledge they have learned. So is the case experienced by the students of class VIII MTsN Sukowono.

Prior Knowledge level of learners depends on their own experience, so Prior Knowledge of each learner will not be exactly the same. Because Prior Knowledge has a strong enough role in learning, the level of Prior Knowledge of each learner will also affect the learning outcomes. In relation to Prior Knowledge of learners in learning, learners with high Prior Knowledge will find it easier to associate new information received with existing knowledge in their minds so that it will make it easier for learners to construct new knowledge.

Initial knowledge gained by learners before learning affects the learning process significantly. If Prior Knowledge is good, educators and learners are easier to interact in a positive way to facilitate learning. Moreover in learning, there are interrelated and more complex levels of knowledge in the future. Those who have a high initial ability, it is easier for them to remember the information they have acquired and more quickly understand the material that has been studied. Pendidik as well as researchers need to know the extent of the initial knowledge of learners so that if the initial knowledge is good enough, then there is no longer the need to discuss in the learning process. Researchers predict early knowledge also influence the learning outcomes of students class VIII MTsN Sukowono.

Hence the application of Problem Based Learning model by using Mind Mapping in terms of Prior Knowledge level gives influence to the learning result of students in class VIII MTsN Sukowono. Prior Knowledge held by students, it can help and facilitate for learners in understanding the learning materials provided by the teacher, so that affect the learning outcomes obtained by learners. Learners who have high knowledge then the results obtained will also be high learning. Conversely, if the Prior Knowledge held by learners is low, then the resultant learning will also be low.

## 5. CONCLUSION

Based on data analysis and discussion on the effect of Problem Based Learning Model by using Mind Mapping viewed from Prior Knowledge to Student Learning Result, it can be concluded that:

There is a significant effect of Problem Based Learning Model by using Mind Mapping on student learning outcomes in Social Studies subjects in MTsN Sukowono Class VIII Lesson Year 2016-2017, which is of significance ( $\text{sig.} = 0.000 < \alpha = 0.05$ ).

While at the level of Prior Knowledge of learning results, there is a significant influence that is the significance ( $\text{sig.} = 0.000 < \alpha = 0.05$ ). Overall There is a significant effect of Problem Based Learning model by using Mind Mapping in terms of Prior Knowledge level on student learning outcomes in social studies subjects in MTsN Sukowono Class VIII Year Lesson 2016-2017 with the value of  $\text{sig.} = 0.007 < 0.05$ .

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