

Learning Approaches and Academic Background towards Problem Solving and Learning Achievements

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Abstract: This article discusses the mind map of learning approaches and academic background in accordance with the ability of problem solving and learning achievement in the lesson of Basic Physiology. The design of this research is simplified 2x2 factorial design. The population of this research is students of 2010 of IKOR from 2 different classes. The data obtained later are analyzed using ANOVA method. There have been various researches regarding the issue of learning using Mind Map, which prove that mind map succeeds in improving students' achievements. Overall, the achievement of result and ability of problem solving with this approach proves better than lectured learning. Interaction occurs among learning approach, academic background and problem solving. Students whose academic background includes Science class at Senior High School, score better with mind map learning approach than lectured learning.

1 INTRODUCTION

Result of performance in the subject study of Physiology has not met the standard of competency. This indication is based on direct observation where students do not fulfill the standard of competency in the mid-term exam. Students' achievement in the form of score printed on a paper is the physical result of education, with which the curriculum builders formulate the standard for the better education. As in this scientific method which focuses on changing the way of thinking of students into the scientific ones, so that it can analyze the cause and result scientifically. Achievement result which is formulated by curriculum was also initiated by (Bloom et al., 1956) a teacher who built curriculum and had to find the purpose of education which goes towards the cognitive area. The Cognitive area in that statement signifies the activities such as knowledge, understanding, application, analysis, interpretation, integration and assessment.

Academic background refers to a student's interest in his study at senior high school which means the student is directed to his field of study of his interest. As stated in (the Ministry of Education and Culture, Development of Human Source of

Education and Culture, 2013) which states that students' field of study is a unity and is integrated in educational effort. According to the country's constitution number 20 year 2003 regarding National Educational System chapter 1 article 19 (the People's representative council of Indonesia, 2012), it is stated:

"Curriculum is devised plan and management regarding the purpose, content, additional subjects and used method as a guideline in conducting the process of learning for certain educational purpose"

The changes in curriculum which are carried out are based on the consent that development is highly influenced by global circumstances, advancement of science, knowledge and technology as well as art and culture. In 2013 the Ministry of Education and Culture initiated the development of curriculum and succeeded in creating the 2013 curriculum. The 2013 curriculum has a concept that students are able to develop their skills, talent and interest more extensively with the principle of individual difference. As written in the guideline of the 2013 curriculum, it is stated that the structure of the 2013 curriculum provides (1) Obligatory subjects of study for all students in one educational institution in one term of study, and (2) Optional subjects of study for students in accordance with their interest.

In his book, Popper reveals that formal science is essential information from hypothesis, theory, and law of how things work (Popper, 2002). In the speech Popper explains that discovering and describing how something works is the essence of science. His saying of “describing how something works” is in accordance with the concept of this mind map, as written in the book (Buzan, 2006) which states that the bigger the stimulation to both sides of your brain at the same time, the more effective it helps you to remember. Buzan emphasizes that the use of both sides of the brain helps you remember more effectively. It is generally accepted that the skill of analysis relies on the left part of the brain and to depict or imagine things people rely on the right part. Researchers agree that using mind mapping enable students to balance the usage of both and effect in the their achievements.

As Blooms stated that problem solving or ability to solve issues become one of the aim of cognitive area, which is one of the aim of scientific method. That being said, as an educator and conductor of learning proses, a teacher must take students’ ability in problem soving into account. It is because the aim of learning is to help form students’ ability in solving problems they come across in their real life. That is the reason that researchers have been trying to figure out how big this method puts an effect in children in their problem solving. In his book (Buzan 2006a) he emphasizes that understanding our own way of thinking can help us in the usage of phrases or pictures in the mind map format. That way will affect how we remember, revise, recall, organize, think creatively and solve problems in the learning process. (Markowitz and Jensen, 2002) defines mind map as a technique of verbal visualization into images which can help people record, strengthen and remember information that has been learnt. Obviously the inventor of the learning method of mind map assumed that this model can help solve problems.

Mind mapping is one the methods that can be chosen in learning science with characteristics and it can be explained systematically and rationally. This Mind Map has been implemented in various subjects of study which consequently improve students’ achievement. As an example, a reseach carried out by (Holland, Holland and Davies, 2004) titled “An Investigation into the Concept of Mind Mapping and the Use of Mind Mapping Software to support and improve students’ academic performance”. Briand concludes that almost all of the students agree to perform the mind map method as it helps students a lot in learning school subjects. It is unfortunate that a subject study that is considered the fundamental

lesson of physical education still adapts the traditional method or lectured based learning.

The usage of the Mind mapping method has been attracting researchers to observe its relation with learning motivation and ability, as well as various subjects. For instance, a research carried out by (Nora Tri Setyaningrum, 2012) “Application of the Mind Map Method in Improving Reading Skill and Comprehension to 3rd Grade Students with Hearing Disability at School for Disabled Students As-Syifa East Lombok”. In this research a significant result is apparent. The result concludes that Mind mapping concept and work books have a beneficial role in helping students to learn the technique and situation where they are in.

There are also a large number of journals regarding medical science which support the Mind Map learning method, one of which is an article in BMC Medical Education (2010) by (D’Antoni et al., 2010). Antoni states that in demonstrating the usage of mind mapping to students of pharmacy this method enabled him to give the perfect repetition efficiently in a short period of time.

It is expected that teachers change their mind set that learning process does not only revolve around transferring the knowledge from them to their students but also make their students comprehend the content of the lesson they learn. This Mind mapping method aims at helping students understand and comprehend the content of the lesson. Researcher in this study takes students of Physiology class as a subject, for the reason that Physiology science is a lesson which can be pictured and arranged systematically. So far the lecturers have been applying the lectering method so that students find difficulty in understanding and remembering this lesson. Researcher assumes that this Mind mapping method helps teachers deliver the lesson more easily and enables teachers to provide students with better understanding regarding the lesson.

2 METHODS

2.1 Population and Sample

2.1.1 Population

The population of this research is the students of even smester year 2016 at IKOR taking basic physiology science. There two classes and each classes consists of 49 students and 51 students respectively. The faculty of Physical Education is the only faculty of UPI which includes the class of basic physiology

science, obviously the class is vital in physical education.

2.1.2 Sample

The selection of sample takes the totalling sampling technique. It is determined by taking the students from both class A and B from physical education science year 2016. Class A consists of 51 students (9 of whom took social class at their previous formal education and the remaining 42 took science). Class B consists of 49 students (13 of whom took social class and the remaining 36 took science). Referring to the method of factorial design 2x2, the selection of groups is determined by random assignment using drawing technique. As a result Class A is taken as the control class with lecturing method and Class B is taken as the experimented class with Mind mapping method.

2.2 Instrument of Research

In this study, the researcher takes 2 instruments. In order to assess the performance of study and problem solving skills of the students. The instrument used for assessment of performance is subsumative test whose each unit of the test is directly distributed by the basic physiology science lecturer. To determine the problem solving skills, a PSI (Problem Solving Inventory) questionnaire is distributed among students, PSI was developed by (Heppner and Petersen, 1982), whose article discusses dimensions of the process of problem solving and explains the development of Problem Solving Inventory based on factors of result analysis. Later it was proven by a research conducted by (Tian, Heppner and Hou, 2014) titled "Problem-Solving Appraisal and Human Adjustment: A Review of 20 Years of Research Using the Problem Solving Inventory" which concludes that PSI is useful not only to assess the level of problem solving skills but also the general psychological issues.

2.3 Procedure of Research

The following are the procedures of this research :

- Researcher determines two second grade classes of IKOR as the sample of this research using the totalling sampling technique.
- Researcher determines the tasks for each respective class.
- Researcher conducts the class learning for each classes in accordance with the curriculum. The experimented class is given the Mind mapping learning method with the learning steps as seen

in table 3.4 and the control class is given the lectured learning method.

- Researcher conducts a post test in both classes to assess their achievement in learning the subject, by looking at their improvement in problem solving and performance. Prior to this post test, students state their educational background.
- Researcher analyzes the data to see study the result and accept the hypothesis which is proposed in the research using ANAVA and immediate Scheffe test.

3 RESULTS AND DISCUSSION

Performance result and Problem Solving skills after the Mind mapping method is conducted in the class are proven better than lecturing method. There are significant differences between Mind Map approach and lecturing method which can be seen in the average score. The average score of the class adopting Mind Mapping approach is in accordance with the result of the research by (Juhariah, 2015) "The average score of pre-test of the experimented class is 45,0 and the post test is 73,0, this indicates a significant improvement of students' performance." Her research was conducted in 3 meetings or the ending of one basic competency. The high score after Mind map approach is used is the combination of performance and problem solving results.

This result is supported by the result of a research by (Perihan and Kobacas, 2012) which states that learning strategy will put an effect in problem solving skills of students. It can be concluded that each learning process given to students will affect their problem solving skills. As it is generally accepted that problem solving is how one can be confident in solving his problems. There are significant influences of ordinal interactions between Mind mapping approach and Lecturing method in students with different academic background (Social and Science study) towards the result of performance and problem solving. There are also significant interactions between learning approach and academic background in the result of performance and problem solving. This finding is due to the Mind mapping method which helps students with background of Social study earn high score than those with background of Science and Social study in the control class.

Another factor which causes the interactions between learning approach factor and academic background factor is that Social study class which has been predicted to gain higher score in lecturing method class is proven wrong, furthermore the Mind mapping method has succeeded in helping students

with Social study background to gain better score than those with Science study background using lecturing method. In accordance with an article by (Nur Faralina, Shahrul Kadri and Nurul Syafiqah, 2015) which discusses correlations between pre-class task and academic background, the statistical result indicates insignificant correlation between pre-class task and academic background in selected sample. Nur Asrab suggests that this is because of instructional approach which is not bias to students with both academic backgrounds. The phrase “not bias” means that instructional approach can be accepted by both academic backgrounds and it improves the learning process.

4 CONCLUSIONS

Based on the data analysis obtained, it is thoroughly proven that Mind mapping approach creates a significant difference in the performance result and problem solving skills. Mind mapping learning approach is better than lecturing method. This signifies that Mind Mapping learning approach has succeeded in leaving a positive effect which is proven better than lecturing method. Referring to the observation, students seem to focus better on the lesson in the class while the mind mapping approach is being conducted. There is an interaction between learning approach and academic background which is proven with Anava calculation. This becomes a reference to the result that the students with academic background of Social study who attended the class conducted with Mind Mapping approach managed to equate the result of the students with academic background of Science study. That is to say that students with academic background of Social study succeeded in exceeding the performance result of students with both academic backgrounds of Social and Science study in the class conducted with lecturing method.

Further study conducted shows the difference between subgroups. It supports the conclusion of this research that Mind mapping learning approach is better than lecturing method, for students with both academic backgrounds. Thus researcher would like to share some feedbacks related to the result of this research as follows : further researches, it is advisable to take learning approach which is based on scientific method as comparative variables so that the difference will not be overly significant between the two learning methods. In addition, it is necessary to study the motivation of students to learn after the treatment of the learning approach. Researcher

suggests that stakeholder pays a careful attention and consider different factors within the students as there is a difference of academic background which may result in differences of result. In the use of Mind Mapping approach, it is advisable to provide retention as a maintenance of ability.

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