THE EFFECT OF DISCOVERY LEARNING MODEL ON THE SCIENCE COMPETENCY OF STUDENTS (LITERATURE STUDIES FROM VARIOUS SOURCES)

Ariati, C [1 a)] , Yurnetti [2]
[1,2]**Department of Science Education, Padang State University**

[a)]**E-mail: chelvikaariati@gmail.com**

ABSTRACT

Natural Science (IPA) is one of the subjects at the junior high school level, generally taught as an integrated science that studies living things physically and chemically. The main problem is that the competence of students in learning has not been achieved. This could be further improved through applying from discovery models. The goal of this study was to analyze and describe the impact of practicing discovery learning education on student academic competence based on grade at junior high schools, based on learning outcomes, and based on the subject matter. This study including a qualitative descriptive study put on a meta-analysis method. Discovery learning model is effectively used to improve the competence of students based on the class level in junior high school. It can be seen from the effect size value is the effect of discovery learning model on students science competence is 1.33 in a very high category, which means that the discovery learning model has a great effect on increasing competence of students and the use of discovery learning models for subject matter have a great influence, especially on the subject of hydrostatic pressure and Archimedes law.

© Department of Science Education, Padang State University

Keywords: Discovery learning, Science Competence, Effect's Size

INTRODUCTION

Education is an effective means of improving the quality of people's welfare, and capable of delivering the nation to prosperity. The quality of education describes quality of human resources so that education one of main indicators

for development and improvement by human quality. Real education closely related to national development because education determines the progress of a nation. One of the benchmarks for the quality of education through the evaluation of Program for International Student Assessment (PISA) on December 3, 2019, Indonesia's score is ranked 72 out of 77 countries in reading, and mathematics scores are ranked 72 out of 78 countries, and science scores are ranked 70 from 78 countries.

Formal education is also called school education, where education needs are obtained at an age level. The formal education is SMP (Junior High School) concerning basic education which explains that basic education consists of SD (Elementary School) / equivalent and SMP (Junior High School) / equivalent. Education and learning at the junior high school level place a basic emphasis on preparing generations to become human beings capable of facing the challenges of the times. Natural Science (IPA) is one of the subjects at the junior high school level, generally taught as an integrated science that studies living things physically and chemically.

To connect between fields of scientific study in each study of a problem, by connecting a theme or concept discussed from the related field of study. So that the use of time to discuss it is more effective, so learning is carried out in several relevant concepts to become a theme (Trianto, 2010: 6). Since most of the directions of science learning in junior high schools are limited to mastering concepts, as a result, there is a very little touch on other aspects such as scientific attitudes and skills.

The main problem is that the competence of students in learning has not been achieved, because students lost enthusiastic in the learning process which is the fact are so many teachers still using methods that tend to be the same every time a class meeting makes the learning atmosphere monotonous. This shows that students are more silent and not listen seriously while the teacher explains the lesson. Another problem can also be seen from the answers to the students' understanding of the exam which are fixated on the teacher's explanation without concluding the results of their thoughts. The individual differences of students are not given attention when discussing, The impact is the achievement of a student learning objectives.

The solution on this problem is utilization of the discovery learning model. The reason choosing discovery learning model because has a lot of the research been done, with discovery learning model students will get a deeper understanding of science lessons and will be more interested in lessons that involve them in "doing" investigations. The discovery learning model is considered suitable for knowing the competence of students, the results from previous research both nationally and abroad, in the form of several articles sourced from journals and relevant theses that support using away from discovery learning models for students.

PURPOSE

Some goals that take to analyze and describe the effect of discovery learning model on the scientific competence out of students based the class level in SMP, based on learning outcomes and based on the subject matter.

RESEARCH QUESTION

The poin of view from the problem is: "How the discovery learning to effect with the scientific competence out of students based on the class level in SMP? and How the effect through discovery learning model up the scientific competence based on students learning outcomes? and How discovery learning model into effect of the on the scientific competence from the students based on the subject matter? "

METHOD

This study applied a qualitative descriptive study using meta-analysis process. Various articles on journals related to variables are collected and reviewed and a conclusion is drawn. Meta-analysis is a quantitative method used to organize information obtained from a lot of data. Descriptive research according to Sugiyono (2009: 35) is a study that describes an incident by focusing on what was there when the research was carried out. While the qualitative approach is not testing through statistical procedures.

Meta-analysis can be defined as a technique of combining existing data to obtain new, more in-depth conclusions and concepts. So meta-analysis is a research technique that uses a quantitative approach to summarize the results of primary research, as many as 2 or more similar studies to get a conclusion. The journals analyzed in this study started from 2010 to 2020, amounting to 13, namely 3 international articles and 10 national articles. The article discussed is related about effect from discovery learning models based on the competence of students within scientific learning.

The population in this study were all articles about discovery learning model that give effects related the competence of students on science learning published at journal that have ISSN both National and International.

The sample was several articles that involved all of effect the discovery learning as the competence of students inside science learning published to journals that had ISSN both National and International.The independent variable used for research is the effect of the discovery learning model. While a dependent variable in this study was the competence of students in science learning. This study using secondary data because it was obtained from the results of previous studies. The data were collected using documentation techniques.

The step in conducting meta-analysis research is selecting the title and screening of journal abstracts according to the criteria, screening all relevant texts according to the criteria and coding, collecting data on general journal information such as authors and sources in tables, determining the data to be analyzed based on the analysis table, drawing conclusions from the analyzed data, and presenting the results. Data analysis was applying by qualitative descriptive and to calculate data using formula of effect size.

RESULT AND DISCUSSION

The first result of this study analyzed 13 articles about the impact of discovery learning models be based students science competencies. The procedure for selecting literature, articles related the effects of discovery learning models based to students science competencies were selected, because discovery learning models have the effect that was very interesting to study in science learning. Many research facts from the experimental class show that on science learning outcomes through of students use discovery learning were better than the control class.

The second result in this research is that generally the articles analyzed to discuss the problem of the effect discovery learning models

on several students 'science learning outcomes, which were proven be able that improve students's learning outcomes. As the research conducted by Dahlia (2016:1-5), who wanted to observing the effect of the discovery learning model keep on students' affective domain competencies, the results were that the affective competence of students whom followed stride the discovery learning model was significantly better, which means that there was an increase in the affective domain for students since learning to use discovery learning.

The third result is the effect size value of the effects from discovery learning models based on students' the science learning outcomes in terms of class level in junior high school, seen in table 6, the effect of discovery models is greater in class VIII, which is 1.29 compared to class VII, but the both have the same category. Ie highest category. Bring out discovery learning model is effectively used in seventh and eighth-grade levels of junior high school. Give influence for the competence of students for example, in the knowledge aspect, spiritual attitude aspect, social attitude aspect, and skill aspect.

The magnitude of the effect getting know discovery learning model from student refer to the research of Rahman (2020) which examines the effect of scientific-based LKPD on discovery learning models for learning outcomes of class VIII students, the results can be used as an alternative in the process of increasing activity. In line with the results of Wulandari's research (2013: 8-9) states that the role of LKPD is very large in the learning process because it can increase students activity in learning and its use can lead students to find concepts through their activities.

Furthermore, the fourth result is effect of discovery learning based of students learning outcomes consisting of aspects of cognitive competence (knowledge), affective (attitude), and psychomotor (skills). Good results were obtained from the average effect size data in table 7 with the number 1.19 in the very high category of knowledge competence, while from the attitude competency the average effect size was 0.89 with a very high category, and for competency skills, the average value of the effect size is 1.23 with a very high category.

According to Mulyasa (2004: 37-38) competence is as knowledge, abilities, and skills, which a person has and becomes a part of himself so that an individual can perform cognitive, affective, and psychomotor behavior as well as possible. From the average value of the effect size based on the outcomes from learning of students in very high category, that mean these discovery learning is a effective model to increasing the competence of students. Therefore, that be use an alternative to make up student learning outcomes.

Fifth result regarding the effect of discovery learning models based students' science competencies, it has a great effect on science subject matter. Based on the subject matter, in table 8 that the highest effect size score is the material for hydrostatic pressure and the Archimedes law of 2.73 (a very high category). While the lowest effect size is obtained in the subject matter of substance change with a value of 0.53 (high category). With an average effect size value of 1.16 (very high category), so the discovery learning is a model that effectively used in science subject matter.

Based the results from research obtained, this explained effect of discovery learning models on students 'science competencies had a good effect in increasing students' competencies and learning outcomes in science. The study can descriptive analysis and effect size in this study discussing the effectiveness of discovery learning models involving experimental and control class, learning outcomes obtained effects for treatment

given to the experimental class. So that discovery learning be a alternative model to improve the scientific competence of students.

CONCLUSION

This study concludes that the articles analyzed in this study are generally about the effect through discovery learning models to the science competencies from learner such as aspects of knowledge, attitudes, and skills. Then, the effect size value of the effect of discovery learning models for students' science learning outcomes are 1.33 in the highest group, which means discovery learning model has a great effect on increasing the competence through students. Furthermore, in terms of class level in junior high school, this model effectively used for increase competence of students. It is visible the effect size score is greater in class VIII, namely 1.29 in the very high category.

The implementation of the discovery learning model based to the learning outcomes of learners can be used as well as alternative in the science learning process because it can improve student learning activities for the better. With the very high effect size category for each competency, namely 1.19 for knowledge competence, the effect size value for attitude competence is 0.89 and 1.23 for skills competency. Thus, the practice of discovery learning models for subject matter has a greater influence especially within the material hydrostatic pressure and the laws of Archimedes.

REFERENCES

Agus Sujarwanta. 2012. *Mengkondisikan Pembelajaran IPA dengan Pendekatan Saintifik*. Jurnal Nuansa Kependidikan. 16 (1)

Azwar, Saifuddin. 2010. *Metode Penelitian*. Yogyakarta: Pustaka Pelajar.

Becker, Lee. 2000. *Effect Size (ES) Journal Effect Size Measures for Two Independent Groups*. (Online). (http://web.uccs.edu/lbecker/Psy590/es.html), diakses tanggal 20 Desember 2020.

Bundu, Patta. 2006. *Penilaian Keterampilan Proses dan Sikap Ilmiah dalam Pembelajaran Sains Sekolah Dasar*. Jakarta: Depdiknas.

Dahlia. 2016. *Pengaruh Model Pembelajaran Discovery Terhadap Kompetensi Ranah Afektif Siswa pada Mata Pelajaran Biologi Kelas VIII MTsN Rambah Tahun Ajaran 2014/2015*.Edu Research Universitas Pasir Pangaraian. 5 (1)

DeCoster, J. 2009. *Meta-Analysis Notes*. (Online).(http://www.stat-help.com/meta.pdf), diakses tanggal 20 Desember 2020.

E. Mulyasa. 2004. *Kurikulum Berbasis Kompetensi*. Bandung: PT Remaja Rosdakarya.

Fathurrohman,Muhammad. 2015. *Model-Model Pembelajaran Inovatif*. Yogyakarta : Ar-Ruzz Media.

Heri Retnawati dkk. 2018. *Pengantar Analisis Meta*.Yogyakarta: Parama Publishing.

Hosnan, M. 2014. *Pendekatan Saintifik dan Kontekstual dalam Pembelajaran Abad 21*. Ghalia Indonesia. Bogor.

Joyce, B., Weil, M., & Calhoun, E. 2000. *Models Of Teaching*. New York: Allyn and Bacon a Pearson Education Company.

Merriyana, R. 2006. *Meta Analisis*

*Penelitian Alternatif bagi Guru.*Jurnal Pendidikan Penabur. 6 (5)

Nofianti. 2019. *Pengaruh Model Discovery Learning Didahului Tugas Rumah Membuat Peta Konsep Terhadap Kompetensi Belajar Peserta Didik Kelas VII SMPN 16 Padang*. Padang:Universitas Negeri Padang.

Rahman, Aulia. 2020. *Pengaruh LKPD Berbasis Saintifik pada Pembelajaran Model Discovery Learning Terhadap Hasil Belajar IPA Peserta Didik Kelas VIII di SMPN 30 Padang*. *Pillar Of Physics Education* Universitas Negeri Padang. 13 (3).

Sani, Ridwan Abdullah. 2015. *Pembelajarn Saintifik untuk Implementasi Kurikulum 2013*. Jakarta: Bumi Aksara.

Sugiyono. 2011. Metode Penelitian Kuantitatif, Kualitatif dan R&D. Bandung: Afabeta.

Tawi. Mirzal. 2008. Konsep Meta Analysis.(Online),(https://syehaceh.wordpress.com/2008/ 05/15/konsep meta-analysis/) , diakses 21 Desember 2020.

Trianto. 2010. Model Pembelajaran Terpadu, Konsep, Strategi dan Implementasinya dalam KTSP. Jakarta: Bumi Aksara.

Wulandari. (2013). *Pengembangan Lembar Kerja Siswa Berbasis Cerita Bergambar Pada Materi Sistem Pencernaan di SMP*. Skripsi Jurusan Biologi Universitas Negeri Semarang.