META-ANALYSIS OF THE EFFECT OF THE PREDICT OBSERVE EXPLAIN (POE) LEARNING MODEL ON STUDENTS' PHYSICS LEARNING OUTCOMES

UNDERGRADUATE THESIS

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EXAMINATION

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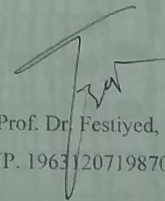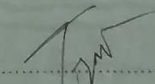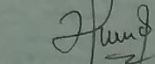Faculty   : Mathematics and Natural Science

META-ANALYSIS OF THE EFFECT OF THE PREDICT OBSERVE
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LEARNING OUTCOMES

It was declarate that she had passed after being defended in front of the
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ABSTRACT

Arzila Nurshafara, 2021. "Meta-Analysis Of The Effect Of The Predict Observe Explain (POE) Learning Model On Students' Physics Learning Outcomes"

The POE learning model is the main choice in overcoming problems in physics learning, so many similar studies on the POE learning model have been conducted by previous researchers. The results of previous studies show that there is a significant effect of the application of the POE learning model on physics learning. Therefore, this study will re-analyze by collecting statistical data from previous studies using effect size measurements on the effect of the POE learning model. The appropriate method to conduct this research is to use the meta-analysis method.

The type of research that be used is meta-analysis research. This study aims to review previous research based on a quantitative approach by analyzing quantitative data from the results of previous studies to accept or reject the hypotheses proposed in these studies. Through several meta-analysis procedures, namely, determining research themes, determining relevant research, coding the literature, calculating effect sizes, calculating summary effects, and making interpretations, conclusions from analysis results, and reporting.

From the results of the meta-analysis conducted based on aspects of assessment of learning outcomes, educational unit level, and regional units, it was found that: (1) the Predict Observe Explain learning model has a great effect on cognitive aspects and affective aspects with summary effects of 0.995 and 1.011, (2) The Predict Observe Explain learning model is very effectively applied at the junior high school and senior high school levels with summary effects of 1,066 and 0.911, and (3) the use of the Predict Observe Explain learning model has a very high effect on the Sumatera region with a summary effect of 1.240.

Keywords: *Meta-Analysis, Predict Observe Explain Model Learning, Learning Outcomes*

DEDICATION

Alhamdulillahirabbil'alaamiin, I give my deep gratitude to the presence of Allah SWT, who has given His mercy and blessing to me. I dedicate my undergraduate thesis work to my family and many friends.

A special feeling of gratitude to my loving parents, Mr. Afrizal and Mrs. Yetmi Lidya, whose words of encouragement and push for tenacity ring in my ears.

To my beloved brothers and sister, Ahmad Muharrazil, Ahmad Oktipa Raztu, Ahmad Razfadli Sabri, Ahmad Razan Wazaqia, and Azrifela Nuryedia have never left my side and are very special.

I dedicate this undergraduate thesis and give special thanks to my best friend Syaza, Deni, Uti, Kelsi, Uchi, Shinta, Ninda for being there for me throughout the entire my college life. All of you have been my best cheerleaders, my moodboster, and my family.

I also dedicate this undergraduate thesis to my many friends and Phynter 2017 family who have supported me throughout the process. I will always appreciate all they have done.

FOREWORD

بِسْمِ اللهِ الرَّحْمَنِ الرَّحِيْمِ

Alhamdulillahirabbil'alaamiin, I give my deep gratitude to the presence of Allah SWT, who has given His mercy and blessing to me so that I can complete this undergraduate thesis entitled *"Meta-Analysis of the Effect of the Predict Observe Explain (POE) Learning Model on Students' Physics Learning Outcomes"*. This undergraduate thesis was compiled to fulfill the requirements for obtaining a Bachelor of Education degree in the Department of Education Physics Faculty of Mathematics and Natural Sciences, Universitas Negeri Padang (UNP).

In the preparation of this undergraduate thesis, I received a lot of suggestions and feedback both from the campus and from my comrades, wholeheartedly I would like to thank:

1. Mrs. Prof. Dr. Festiyed, M.S as Academic Advisor and Supervisor has given me guidance in preparing the undergraduate thesis and motivated me to design the undergraduate thesis.

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7.   My comrades and All parties have helped in the preparation of the undergraduate thesis.

All my efforts have been done to complete this undergraduate thesis as well as possible, hopefully, all the help that has been given gets a reply from Allah SWT. Amin Ya Rabbal Alamin.

Hopefully, the writing of this undergraduate thesis can make a positive contribution and create a critical attitude for me and readers in general to always continue to gain insight and knowledge in the field of technology. I realize that the implementation and preparation of this undergraduate thesis are still far from perfect. For this reason, the author needs guidance, criticism, suggestions, and feedback for the perfection of this undergraduate thesis in the future.

Finally, I apologize for all the shortcomings contained in this undergraduate thesis, hopefully, this undergraduate thesis can be useful and add insight for readers and myself. Thank you so much for your attention.

Padang, 10 December 2022

ARZILA NURSHAFARA

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CHAPTER I
PRELIMINARY

A. Background

The era of the industrial revolution 4.0 is a phase of the technological revolution that changes the order of human life in a more complex direction. The development of increasingly technological advances causes all forms of human activity to be affected by unpredictable global conditions. In dealing with this, quality human resources (HR) are needed. To create Quality human resources, education is very much needed as a provision to face the era of the industrial revolution 4.0. One of the government's efforts to improve education is by developing a curriculum.

The 2013 curriculum is a form of curriculum improvement previously in Indonesia. The 2013 curriculum contains several important points, including strengthening character education (PPK), literacy, 4C skills (Critical Thinking, Creativity, Collaboration, and Communication), and Higher Order Thinking Skills (Siswanto, 2018). Teachers are required to develop learning by integrating strengthening character education (PPK), literacy, 4C skills (Critical Thinking, Creativity, Collaboration, and Communication), and Higher Order Thinking Skills. Not only that, the 2013 curriculum provides the chance for students and develops increasing potential ability in attitudes, knowledge, and skills that constitute aspect evaluation outcomes that emphasize the implementation of Curriculum 2013. In the implementation 2013 curriculum, physics learning requires students to act in the learning process.

Physics is physical knowledge (Physical Science) which is one of the parts of natural science (IPA). IPA is the results or product of certain processes that produce a bunch of concepts and charts which concept to use method scientific emphasis on the process of observation and experimentation (Amali, 2014). Following the nature of science, in the learning process of physics, observation skills are very fundamental for doing exploration of phenomena and for testing ideas involving all senses (Zulaeha, 2014). Physics learning requires students to be involved in accruing their knowledge. However, physics learning at school still uses the conventional learning model, which is this the learning model does not completely involve students to accrue their knowledge. That matter causes a low understanding of concepts and students' outcomes.

The solution needed to resolve the low concept understanding and students' outcomes is to apply learning that is central to students. Students-centered learning education could help in developing all the potential that students have. One learning method that can be a solution is a Predict, Observe, and Explain (POE) learning model. The POE learning model was first developed by White and Gustone in 1992 (Hakan, 2011). According to Warsono and Hariyanto (2012), the POE learning model is a learning model based on the theory of constructivism which is students' cognitive structure will be formed when the learning process through activity predicts, observe and explain observation results.

According to a journal study by Restami (2013) that POE learning can facilitate students in developing mental and physical activity by maximum. POE learning model is already reasonable many applied inside research. of all a lot study

Regarding the POE learning model, twenty-eight appropriate literature was obtained according to the research criteria. Based on twenty-eight pieces of literature have known that each study has the same conclusion that the POE learning model has a significant effect on the students' physics outcomes. Although the conclusion of twenty-eight pieces of literature is the same, however the big effect size of twenty-eight pieces of literature is different. This thing is caused by the sample data used in each literature being different, which is statistical data in each literature get to vary. Statistical data differences of twenty-eight literature about the POE learning model on physics learning then needed to reanalyze with the meta-analysis method.

Meta-analysis is one quantitative study method that uses data from previous relevant research. In this research, a meta-analysis will be carried out on literature about the effect of the POE learning model, especially on physics learning. The literature that will analyze consists of twenty-eight pieces of literature, which are three undergraduate thesis and twenty-five articles. From the analysis result, different statistical data were obtained from every analyzed literature. because of that, this study will reanalyze by doing statistical data collected from the previous study and use effect size measurement on the effect of the POE learning model. Then the suitable method for doing this study is to use the meta-analysis method.

Meta-analysis research was chosen as the method in this study for several reasons. First, there has been no previous research that carried out a meta-analysis of the POE learning model by making a statistical conclusion. Second, to analyze quantitative data from the results of the previous study to accept or refuse the

proposed hypothesis in previous research. Third, for knowing the effect of the POE learning model widely, especially on physics learning. Therefore, meta-analysis is a suitable research method to summarize and conclude the results of studies more broadly.

Based on the background of the problem that has been described, I am interested in doing meta-analysis research on the effect of the Predict Observe Explain (POE) learning model on students' physics outcomes. Therefore, this research is entitled "Meta-Analysis of the Effect of the Predict Observe Explain (POE) Learning Model on Students' Physics Learning Outcomes".

B.   Problem Identification

Based on the description of the background, problems can be identified in this study. The problems that have been identified in this study are as follows:

1.   Physics learning still uses the conventional learning model.

2.   Students' concept understanding is still low.

3.   Students' outcomes in physics learning are still low.

4.   The effect size obtained from each literature is different.

5.   There is no research on the effect size of the predict observe explain (POE) learning model on students' physics learning outcomes based on aspects of learning outcomes assessment.

6.   There is no research on the effect size of the predict observe explain (POE) learning model on students' physics learning outcomes based on level unit education.

7. There is no research on the effect size of the predict observe explain (POE) learning model on students' physics learning outcomes based on area unit.

C.   Problem Scope

Based on the description of the background, it is necessary to limit the problem in this study as a limitation of the problem scope, that is:

1. There is no research on the effect size of the predict observe explain (POE) learning model on students' physics learning outcomes based on aspects of learning outcomes assessment.

2. There is no research on the effect size of the predict observe explain (POE) learning model on students' physics learning outcomes based on level unit education.

3. There is no research on the effect size of the predict observe explain (POE) learning model on students' physics learning outcomes based on area unit.

D.   Problem Formulas

Based on the description of the background, the formulation of the problem in this study can be identified. The formulation of the problem in this research are:

1. How is the effect size of the predict observe explain (POE) learning model on students' physics learning outcomes based on aspects of learning outcomes assessment?

2. How is the effect size of the predict observe explain (POE) learning model on students' physics learning outcomes based on level unit education?

3.   How is the effect size of the predict observe explain (POE) learning model on students' physics learning outcomes based on area unit?

E.   Research Objectives

Research conducted needs to be directed to achieve a goal as desired. The aims of this research are as follows:

1.   Determine the effect size of the predict observe explain (POE) learning model on students' physics learning outcomes based on aspects of learning outcomes assessment.

2.   Determine the effect size of the predict observe explain (POE) learning model on students' physics learning outcomes based on level unit education.

3.   Determine the effect size of the predict observe explain (POE) learning model on students' physics learning outcomes based on area unit.

F.   Research Benefits

The benefits of this research are:

1.   For researchers, as basic capital in self-development in the field of research and experience as prospective educators and fulfill the requirements to complete a bachelor's degree in physics education at the Department of Physics, FMIPA UNP.

2.   For educators, as a reflection in reviewing the performance that has been conducted During This is an effort to improve the quality of Physics learning and encourage teachers to be creative in implementing learning models.

3.   For other researchers, as a source of ideas and references for further research