META-ANALYSIS OF THE THE EFFECT OF PROJECT BASED LEARNING MODEL ON PHYSICS LEARNING OUTCOMES IN SENIOR HIGH SCHOOL

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UNDERGRADUATE THESIS

Proposed as one of the requirements for obtaining a Bachelor of Education degree

By :

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UNDERGRADUATE THESIS APROVAL

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AFFIDAVIT

With this letter, i declare that:

1. My paper, the final project in the form of a thesis with this title "Meta Analysis of the Effect of the Project Based Learning (PjBL) Model on Physics Learning Outcomes in Senior High School" is purely my own work.
2. This paper is purely my ideas, formulation, and research without the help of other parties except the supervisor.
3. In this work, no work or opinion has been written or published by others, unless it is clearly stated in writing as a reference in the manuscript by mentioning the author and listed in the literature.
4. I make this statement in the truth and if there are any irregularities in this statement, I am willing to accept academic sanctions in the form of revocation of the degree that has been obtained because of this paper, as well as other sanctions in accordance with applicable legal norms and provisions.

Padang, November 16nd 2021

Statement Maker

Siti Aminah

ABSTRACT

Siti Aminah. 2021: Meta-Analysis of the Effect of the Project Based Learning Model (PJBL) Model on Physics Learning Outcomes in Senior High Scholl

Education is an effort to educate the life of the nation and state. Various efforts in improving the quality of education are by choosing the right learning model. The project-based learning (pjbl) model is very widely used because it has great potential to provide a learning experience for students with more interesting and meaningful learning to learn than other learning models. The first real condition found by researchers is that the learning model used in schools is still not optimal. The second real condition found by researchers is that the results ofstudents' teaching bells and students' science process skills are still low. This study aims to determine the influence of the project-based learning (pjbl) model on high school physics learning outcomes based on student learning outcomes, grade levels, and subject matter units.

The type of research carried out is meta-analysis research. Meta-analysis research is a quantified research methodby collecting, processing and presenting data systematically to accept or reject the hypotheses proposed in the study. The data analysis technique used in meta-analysis research is the effect size analysis technique. The results of this effect size calculation will be interpreted to answer the hypothesis of the gap in the results of previous studies.

The results of the research obtained revealed that the application of the project-based learning (pjbl) model is effective for improving student learning outcomes in aspects of knowledge and skills. The application of project-based learning (pjbl) also has an effective effect on improving student learning outcomes on grade level X and XI in senior high school. Finally, the application of the project-based learning (pjbl) model also has an effective effect on the material units of optical devices, simple harmonic motion, static fluids, dynamic fluids, newton's laws, impulses and momentum, straight motion, heat, and effort and energy. However, the application of the project-based learning (pjbl) model has no effective effect on dynamic electrical matter units, elasticity and keppler laws.

Keywords : Meta-Analysis, Project Based Learning (PjBL) Model, Physics Learning Outcomes in Senior High Scholl

FOREWORD

Praise and gratitude the author expresses to Allah Almighty, for His mercy and gift so that the author can complete this thesis. The tittle of this thesis is "Meta-Analysis of the Effect of the Project Based Learning (PjBL) Model on Physics Learning Outcomes in Senior High Scholl". Shalawat and greetings may always be poured out the Prophet Muhammad SAW. The thesis was prepared to meet one of the requirements in obtaining a Bachelor of Education degree in the Physics Education study program, Faculty mathematics and Natural Sciences (FMIPA) Padang State University (UNP).

During the preparation of this thesis, there has been a lot of advice that the author has obtained both guidance, motivation, criticism, and suggestions that are useful for the author. For this readon, the author expresses his gratitude and appreciation to the honorable:

1. Mrs. Prof. Dr. Festiyed, M.S., as an Academic Advisory lecturer and Thesis Supervisor who has guided and motivated the author in completing this thesis.
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3. Mrs. Dr. Hj. Ratnawulan, M.Si., as the Head of the Physics Department of FMIPA UNP.
4. Mr. And Mrs. Teaching staff and employees of the Department of Physics FMIPA UNP.
5. Parents and families who have provided moral and material support to the

author.

6. Friends and all parties who have assisted in the completion of this thesis.
7. For the author, Siti Aminah. Thank you for working hard and being willing to hold on to the end. You have sacrificed a lot to achieve this title. But I believe after succesfully passing this difficult moment, you can face various obstacles in front of you. I'm proud of you.

May the help and guidance that has been given be a shaleh charity for Mr. and Mrs. And get a double reply from Allah Subhanahu Wata'ala. The author realizes that this thesis still has shortcomings and weaknesses that the author cannot find at this time, for this reason, the author excepts suggestions in improving this thesis. Hopefully, this thesis will be useful for all readers.

Padang, November 16nd 2021

Writer

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CHAPTER I

INTRODUCTION

A. The Background of Problem

Education is an effort to educate the life of the nation and state. The better the quality of education will be better the quality of Human Resources (HR) in a country. According to Law Number 20 of 2003, education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual power of religion, self-control, personality, intelligence, noble character, as well as the skills needed for themselves, society, nation, and state (Depdiknas 2003).

One of the efforts in improving the quality of education is curriculum development. The main principles of curriculum development must be relevant to the development of science and technology (IPTEK). The curriculum that is in line with the development of science and technology at this time is the 2013 curriculum. With the 2013 curriculum, it is hoped that it can develop the potential of students to have the ability to live as citizens who are faithful, productive, creative, innovative, and affective, and able to contribute to the livelihood of society, nation, state, and world civility.

The real conditions obtained after conducting the analysis indicate a gap between the real conditions in the field and the ideal conditions. The first real condition found was the use of learning models that were not optimal so that the learning atmosphere in the classroom became monotonous and sometimes so boring ((Suranti, 2016); (Khanifah, 2016) ; (Jonah, 2016) ; (Turnip, 2016)). In general, teachers are accustomed to using conventional learning such as using lecture methods for all

types or characteristics of the subject matter, even though the physics material itself isdifferent ((Hutapea, 2017); (Yance, 2013); (Hardianti , 2015)). Students only get materials and concepts through regular group discussions, so only some students understand the concept of materi ((Juandi, 2017); (Siregar , 2014) ; (Roziqin, 2018); (Salmi , 2017)).

The second real condition found is that student learning outcomes are still low because of the students' assumption that physics is complicated, causing student enthusiasm to decrease ((Yunus, 2016); (Turnip , 2016) ; (Hutapea , 2017)). The science process skills possessed by students are also low because practicum activities are very rarely carried out in ecolah(Roziqin, 2018). This has caused many students to not recognize the usefulness and even the name of the tools used during practicum activities of certain materials (Salmi, 2017).

The gap that occurs between real and ideal conditions requires solutions to overcome these problems. Responding to these problems is offered a project-based learning (pjbl) model in the physics learning process. Various research results show that the application of the project-based learning (pjbl) model can improve student physics learning outcomes.

The project-based learning (pjbl) model is a learning model that uses projects/activities as a medium in learning. According to Yunus (2016), the project-based learning model has the advantage that it is very good in developing various basic skills that must be possessed by students, including thinking skills, decision-making skills, creative ability, problem-solving ability, and at the same time is seen as effective for developing self-confidence and student management. In addition, according to Luthfi in (Komalasari, 2021), the PjBL model has great potential to

provide a learning experience for students with more interesting and meaningful learning.

Research on the use of project-based learning (PJBL) models has been done by many previous researchers. The results of searches conducted by researchers on articles in international and national journals related to the influence of the project-based learning (pjbl) model have different influences that are only limited to one student learning outcome, one grade level and one subject matter. Based on this reason, a summary is needed to see how much influence the project-based learning (pjbl) model has on overall high school physics learning outcomes using the meta-analysis method.

Meta-analysis research is a form of research that uses other existing research data. Then the existing data is processed and analyzed to make statistical conclusions. The data can be expressed with an effect size that is able to standardize statistics from previous studies with various mathematical equations related to the meta-analysis research carried out.

Meta-analysis research was chosen as this research method for several reasons. First, previous research has only determined the effect on certain learning outcomes or knowledge learning outcomes only. Second, previous research only covered one grade level in high school. Third, previous research only addressed one unit of subject matter.

This meta-analysis research can answer the question of gap in the results of various research results. This meta-analysis research will provide an overall picture of the effect of this project-based learning (pjbl) model on its bound variables. Therefore, this study is entitled "Meta Analysis of the Effect of the Project Based

Learning Model (PjBL) Model on Physics Learning Outcomes in Senior High Scholl".

B. Problem Identification

Based on the background of the problem above, there are several problems that can be identified, including:

1. The Learning Model used is not optimal
2. Learning outcomes of students' knowledge and skills are relatively low
3. Previous studies are still limited to one scope of research.
4. There are many studies on the influence of project-based learning (pjbl) models on physics learning outcomes in high school that have not been summarized thoroughly.
5. There has been no comprehensive study of the effect size of the effect of the project-based learning (pjbl) model on physics learrning outcomes in senior high scholl based on:
   a. Student learning outcomes,
   b. Grade levels, and
   c. Units of subject matter.

C. Problem Restrictions

Based on the identification of the problem, this research is limited to the research title " Meta Analysis of the Effect of the Project Based Learning (PjBL) Model on Physics Learning Outcomes in Senior High Scholl ". Based on the proposed title, it is necessary to give the following restrictions, so that this research is more focused, including:

There has been no comprehensive study of the effect size meta-analysis of the effect

of the project-based learning (pjbl) model on physics learning outcomes in senior high school based on:

1. Learning outcomes on the knowledge aspect and the skill aspect,
2. Grade levels, and
3. Units of subject matter.

D. Problem Formulation

1. How does the effect size affect the project-based learning (pjbl) model on physics learning outcomes in senior high school based on learning outcomes in knowledge aspects and skill aspects?
2. How does the effect size affect the project-based learning (pjbl) model on physics learning outcomes in senior high school based on grade level?
3. How does the effect size affect the project-based learning (pjbl) model on physics learning outcomes in senior high school based on the subject matter unit?

E. Research Objectives

Based on the formulation of the problem that has been described, the objectives of this study are:

1. Determining the effect size of the effect of the project-based learning (pjbl) model on physics learning outcomes in senior high school on knowledge aspects and skill aspects,
2. Determining the effect size of the effect of the project-based learning (pjbl) model on physics learning outcomes in senior high school based on grade levels, and
3. Determining the effect size of the effect of the project-based learning (pjbl)

model on physics learning outcomes in senior high school based on the unit of subject matter.

F. Research Benefit

The results of this study are expected to provide benefits for several parties including:

1. For researchers, as the basic capital to develop themselves in the field of research, increase knowledge and experience as prospective educators, and one of the requirements to complete the Bachelor of Physics Education Program in the Department of Physics, FMIPA Padang State University.
2. For educators, it is used as a consideration to determine the use of appropriate models used in Physics learning and improve student learning outcomes.
3. For other researchers, this research can be used as a source of information and reference material to develop further research.