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Psychological Review in Problem-Based Learning Model on Physics Learning Outcomes of Class X Students

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ABSTRACT

This study aims to analyze the effect of the Problem-Based Learning (PBL) model integrated with Islamic studies on physics learning outcomes of XI science class students at MA Rahmatullah Al-Hasan, Kekait, and West Lombok. The research method used a pure experimental design (True Experimental Design) with a quantitative approach. The research sample consisted of 31 students, divided into an experimental class (16 students) and a control class (15 students). The results showed a significant increase in physics learning outcomes with a t-count value of 3.61> t-table 2.04 (α = 0.05). The average experimental class pre-test score of 68.89 increased to 81.93 in the post-test, while the control class from 67.65 to 74.88. The main contribution of the research is to develop a learning model that integrates Islamic values in physics teaching, which can increase students' motivation and concept understanding. In addition, the study found multidisciplinary linkages between several disciplines that support each other. Among them, is the link between education and psychology through the link between this learning model and the theory of Social Psychology. Therefore, the results of this study indicate the effect of problem-based learning models integrated with Islam and reviewed based on Social Psychology theory on the physics learning outcomes of students in class XI IPA I at MA Rahmatullah Al-Hasan Kekait West Lombok. The advantage of this learning model is that there are verses of the Qur'an that are used as a reference in problem-solving. This is very suitable to be applied to students who have a pesantren background because, with this learning model, the teacher can apply a more creative learning model to increase student interest in learning.

KEYWORDS: Learning Outcomes, Problem-Based Learning, Psychological Theory.

1 INTRODUCTION

Physics is one of the most fundamental sciences. Scientists from various disciplines utilize ideas from physics in their research (Giancoli, 2005). Therefore, it is important to use effective learning methods and models in the teaching and learning process to improve the effectiveness of physics learning. Learning models continue to evolve to improve the quality of education and the quality of learning. Teachers must constantly update the way they teach as it will affect students' learning outcomes. Many learning models emphasize student activeness in the learning process, especially in the K-13 curriculum, such as problem-based learning (PBL), internet-based, and pictorial riddle. If you want to use a student-centered approach, teachers can use problem-based learning models to activate students in the classroom. However, although the term problem-based learning is familiar in the world of education, there are still problems with its implementation in physics subjects (Mailani, 2018). Integration of Islamic Studies is an effort to show that Islam and science are not contradictory but are integrated and cannot be separated from each other. This shows how positive Islam is towards science (and things related to scientific activities). Thus, Islamic

education can be understood completely as "kaffah" (whole and comprehensive, no dichotomy between religious education and general education) (Abidin, 2017).

Based on the results of interviews with Physics subject teachers. He believes that teaching and learning activities at this school are far from perfect due to several reasons. Some of them are interested in learning at school which is still relatively low, especially in subjects that are calculated such as Mathematics, Physics, and so on. Then many students often skip class during study hours. The next reason is that some students think that science subjects such as physics and math are not important because they have nothing to do with religion, especially Islam (Clarotta & Renyaan, 2017).

To overcome this problem, one solution that can be done is to use a learning model that is unique, creative, and able to increase student interest and motivation to learn. One of the learning models that can be used is a problem-based learning model integrated with Islamic Studies(Bahari et al., 2021). The advantage of this problem-based learning model is that students are given the opportunity by the teacher to solve a problem, either randomly chosen by the teacher or chosen by the students themselves. This can encourage students to play an active role in the teaching and learning process, especially if accompanied by the integration of Islamic values that are by the background of students who come from boarding schools. This is what encourages researchers to conduct research at the school with the title "The Effect of Problem-Based Learning Model Integrated with Islamic Studies on Learning Outcomes of Class X MA Rahmatullah Al-Hasan Students in Physics Subjects".

This study aims to determine the effect of the problem-based learning model Integrated Islamic Studies on physics learning outcomes of Class X students at MA Rahmatullah Al-Hasan Kekait West Lombok. Samiudin (2016) states that the learning model is a way of forming or stabilizing the understanding of students (recipients of information) on a presentation of information or teaching material. Therefore, there are three main conditions for teaching and learning activities to take place. The first is students/learners who act as recipients of information. Then the second is the teaching material that will be delivered. The third is the teacher as the introduction and conveying of teaching material (H. Samiudin 2017). Meanwhile, according to Hosaini and Akhyak, (2024), Problem-Based Learning (PBL) is a learning method triggered by a problem, which encourages students to learn and work cooperatively in groups to find solutions to problems, then be able to think critically and analytically and be able to determine and use appropriate learning resources (Hosaini & Akhyak, 2024).

According to Novianti Muspiroh (2013), the integration of Islamic values in science learning will have an impact on the affective, psychomotor, and cognitive domains. Strictly speaking, when this is implemented in science learning at school, it will have an impact on student learning outcomes that are holistic in all learning domains. This will provide a different color from what has been happening so far, where the cognitive domain is dominant or even the only one developed in science learning at school (Muspiroh, 2013). According to Muhammad Kafrawi (2018), Learning outcomes are the results obtained from student learning activities that can be seen in real terms either in the form of scores or in the form of grades after taking a test (Kafrawi, 2018).

Although Problem-Based Learning (PBL) has been widely developed, there are still gaps in its implementation in physics subjects, especially in schools with religious backgrounds. The majority of previous studies have not explored in depth the integration of Islamic values in the PBL model, even though this can be an effective strategy to increase student interest and understanding, especially if teachers understand the psychological context in the application of PBL so that teachers can provide better potential. This research provides a significant practical contribution for various stakeholders in education. For teachers, the findings of this research provide an alternative learning model that is contextual, so that it can enrich the teaching methods that have been used so far. For students, the learning model proposed in this study is expected to increase their learning motivation and conceptual understanding of physics material, which has been considered difficult and less interesting. Meanwhile, for curriculum developers, this research can be a valuable reference in designing integrative learning models, especially those based on Islamic values, to bridge the gap between science and religion.

The urgency of this research can be seen in the context of the problems that surround the world of education today. First, the low interest of students in physics subjects is a serious challenge that needs to

be overcome. Secondly, there is a growing assumption among students that science subjects, including physics, have no connection with religion, thus creating a dichotomy between science and spiritual values. Third, conventional learning methods that are still dominantly used are considered less effective in creating an interesting and meaningful learning process. Fourth, there is an urgent need for innovative learning models that can integrate various disciplines, including religious values, to create a holistic learning experience. Finally, this research also provides a psychological interpretation of the application of the *Problem-Based Learning* (PBL) model, which is expected to encourage students to be more active, critical, and reflective in the learning process. Thus, this research not only answers practical challenges in the field but also provides a strong theoretical foundation for the development of higher quality and relevant education.

2 METHOD

In research on the effect of problem-based learning models Integrated Islamic Studies in improving student learning outcomes this time using actual Experimental Research or True Experimental Design with a quantitative approach. The samples used in the study were Class Xa as the experimental class and Class Xb as the control class. The sampling technique uses *Probability Sampling* with a simpler Simple Random Sampling type. This technique is used based on the situation and conditions in the field. So that is what encourages researchers to use class X as the population with Class Xa and Xb as the sample. The research design this time begins with collecting initial data to obtain information at the research location. Furthermore, further data collection. In this phase, the researcher will conduct research as it should. Starting from doing a pretest and then giving treatment to the sample after that doing a posttest on the sample. The research instruments used are in the form of interview sheets and test sheets. This is because the data collection techniques used are interviews and tests (Sugiyono, 2017).

This research instrument was developed through a series of comprehensive validation processes to ensure the accuracy and reliability of the measuring instruments used. The instrument validation process is carried out by applying the correlation coefficient formula, which aims to test the level of relationship between each question item and the predetermined criteria. In addition, the reliability test was also carried out using Cronbach's Alpha method, where the instrument was declared reliable if the Alpha (α) coefficient value was greater than 0.7. This ensures that the instrument used has high internal consistency and can produce reliable data (Arikunto, 2021).

In the preparation of pretest and posttest questions, researchers refer to Bloom's revised taxonomy as a frame of reference for designing questions that follow the cognitive level of students. The questions compiled include four cognitive levels, namely knowledge (C1), understanding (C2), application (C3), and analysis (C4), to be able to measure students' abilities comprehensively. Overall, there were 35 question items tested on students as part of the empirical validation process. The validity test results showed that 30 question items were declared valid and met the criteria for use in research, while 5 other items were invalid and needed to be revised or eliminated. Thus, this research instrument has gone through a rigorous testing stage to ensure its quality and suitability to the research objectives (Sugiyono, 2017).

2.1 Data Source

The primary data source in this study is based on the results of pre-test and post-test tests on students/research samples. So that based on the results of the test it can be seen how much improvement in learning outcomes is obtained. In addition, there are secondary data sources obtained through teachers and other school parties. As well as the school profile then student data that is used as a research sample. As well as some data from interviews conducted with teachers and students.

2.2 Research Instruments

There are several types of research instruments used such as pre-test and post-test sheets, interview sheets, question instrument validation sheets, and lesson plans. This research instrument has an important role in research more specifically on the data obtained.

2.3 Data Analysis

The data analysis technique used is to use the normality test, homogeneity test, and hypothesis testing using the T */T-Test* test.

2.3.1 The normality test uses the X distribution formula[2] as follows,

$$\mathbf{X}= \Sigma \frac{(\mathbf{f_0}-\mathbf{f_e})^2}{\mathbf{f_e}} \quad (1)$$

Description:

F_o: frequency of observation

F_e: Frequency of Expectation

In this study, a series of statistical tests were conducted to ensure the validity and reliability of the analyzed data. First, a normality test was carried out using the X^2 (Chi-Square) distribution formula. This test aims to test whether the data obtained comes from a normally distributed population. Data normality is a fundamental assumption in many parametric statistical analyses, as this method assumes that the data follows a normal distribution pattern. By using the Chi-Square test, researchers can determine whether the data meets this assumption so that the results of further analysis can be considered valid.

2.3.2 Then test homogeneity using the variance comparison test as follows,

$$S_X^2 = \sqrt{\frac{n.\sum X^2 - \left(\sum X\right)^2}{n(n-1)}} \qquad S_Y^2 = \sqrt{\frac{n.\sum Y^2 - \left(\sum Y\right)^2}{n(n-1)}} \quad (2)$$

Based on the formula above, the F0 formula is then searched for, while the formula for finding F0 is as follows (Arikunto, 2014).

$$F_0 = \frac{Largest\ Variance}{smallest\ Variance} \quad (3)$$

Second, the variance homogeneity test was conducted using the variance comparison method. This test aims to ensure that the variance between the data groups being compared is homogeneous, which is an important prerequisite in further statistical analysis. Homogeneity of variance indicates that differences in the data are not caused by inconsistent variability between groups. By fulfilling this assumption, researchers can ensure that comparisons between data groups are fair and accurate.

2.3.3 For the T-test or T-test in this study, use the following formula.

Description:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2} - 2r\left(\frac{S_1}{\sqrt{n_1}}\right)\frac{S_2}{\sqrt{n_2}}}} \quad (4)$$

$\bar{x_1}$: Average of Sample 1

$\bar{x_2}$: Average of Sample 2

S_1 : Standard Deviation of Sample 1

S_2 : Standard Deviation of Sample 2

S_1^2 : Sample Variant 1

S_2^2 : Sample Variant 2

The hypothesis test in this study used an independent t-test. The selection of this method is based on the consideration that the statistical assumptions required for the t-test have been met. Namely, the data has gone through the normality test and homogeneity test. Independent t-test is used to compare the means of two independent groups, so it is suitable for testing significant differences between experimental and control groups. By ensuring that the data meets the assumptions of normality and homogeneity, the results of the t-test can be interpreted with a high level of confidence, thus providing a strong foundation for drawing research conclusions.

3 RESULTS AND DISCUSSION

3.1 Research Results

In this study using the problem-based learning model Integrated with Islamic Studies, researchers gave pretests and posttests to their respective samples before and after being given the treatment. The pretest and posttest scores obtained by the sample are presented in the table below.

Table 1. Pretest and Posttest Result Data

Class	Number of Students	Pre-test	Post-test
Experiment	15	68,89	81,93
Control	16	67,65	74,88

as for the data in the table above can be seen in the form of a graph as follows

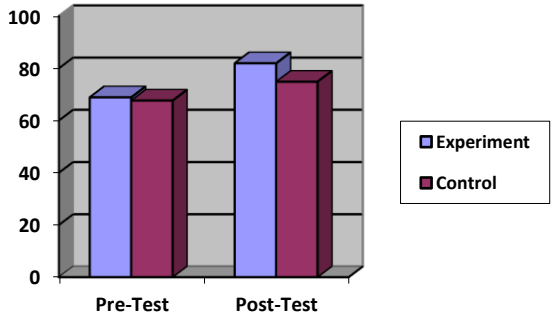

Figure 1. Graphic on Pretest and Posttest Result Data

The results showed a significant difference between the experimental and control classes in terms of improving students' conceptual understanding of physics material. In the experimental class, which applied the *Problem-Based Learning* (PBL) model integrated with Islamic values, there was an increase in the average score of 13.04 points or equivalent to 18.9%. This increase indicates that the PBL model integrated with Islam proved effective in improving students' conceptual understanding and encouraging their active involvement in the learning process. This is in line with the learning objectives that emphasize contextual and meaningful approaches. On the other hand, the control class that used the conventional learning method only experienced an increase in the average score of 7.23 points or about 10.7%. This relatively minimal increase shows that the conventional method is less able to motivate students optimally and does not have a significant impact on their conceptual understanding. This method tends to be more one-way and less involved with students in critical and analytical thinking processes.

Comparatively, the difference in improvement between the experimental and control classes was 5.81 points, with the Islamic integrated PBL model showing 8.2% higher effectiveness than the conventional method. These results indicate that innovative learning models, particularly those that integrate Islamic values, have a greater influence on improving student learning outcomes. This finding strengthens the argument that creative and contextualized learning approaches, such as Islamic integrated PBL, can be an effective solution to overcome challenges in education, particularly in improving students' motivation and understanding of physics subjects.

After the pretest and posttest scores were obtained, the researcher conducted several tests on the data to prove that the hypothesis made by the researcher was acceptable. In this study, in testing the hypothesis, the researcher used three tests, namely the normality test, homogeneity test, and hypothesis testing using the T / T-Test test. A normality test is a test conducted on groups of data or variables to assess whether the data distribution is normally distributed or not. Normality tests can be done on the final test only1. Below is the data from the Normality test results on the sample

Table. 2 Normality Test Result Data

Class	X^2 Measure	X^2 Table	Ket.
Experiment	1,95	14,07	Normally Distributed
Control	3,57	14,07	Normally Distributed

Based on the data above, it can be seen that the X_{count} value is smaller than the X_{tabel} so the distribution in the experimental class that received treatment using a problem-based learning model Integrated with Islamic Studies is declared to be normally distributed. While in the control class that was treated using a conventional learning model had a normal distribution as well because the X_{count} value data was smaller than the X_{table}. After the normality test data is obtained, the researcher conducts a homogeneity test. A homogeneity test is a test of whether or not two data from research variables are the same. The homogeneity test is carried out to determine whether the data in variables x and y are homogeneous or not. The following is a table of data calculating the results of the homogeneity test.

Table 3. Homogeneity Test Result Data

	Ctrl.	Ex.
Average	74.88	81.93
Variance	42.52	15.64

Number of samples	16	15
Df	15	14
F_{table}	0,41	
F_{count}	0,37	

The above value is obtained using the variance comparison test. It can be seen that the variance in the experimental class is different from the control class and $_{Fcount}$ has a smaller value than F_{tabel}. Namely 0.37 for the value of $_{Fcount}$ and 0.41 for F_{tabel}. Because the requirement for homogeneous data is if Fcount < Ftable then the data from the sample can be said to be homogeneous.

As for the T-test. The T-test itself is better known as the partial test. Namely to test how much influence each independent variable has on the dependent variable. Below is a table of T-test calculation results.

Table 4. Data from Hypothesis Test Results using T Test

Class	Number of Students	Average	thing	table
Experiment	15	81,9	3,61	2,04
Control	16	74,8		

Based on the data above, it is known that tcount> t_{tabel} then there is an influence, or the hypothesis is accepted (H_a accepted). The above data was taken from samples in the experimental class with a total of 15 students with an average value of 81.9 then in the control class with a total of 16 students with an average value of 74.8 So that a tcount of 3.61 and a ttable of 2.04 were obtained.

This is by previous research in the first journal written by Elsy Indriani and Irdam Idrus (2018) with the research title Improving Student Learning Outcomes Through Problem-Based Learning Models. The research method used in this research is class action research with data analysis techniques using descriptive quantitative analysis. Improvement of learning with the Problem-Based Learning (PBM) model can improve the learning outcomes of students of Class X IPA2 SMAN 4 Bengkulu Selatan, namely with classical completeness in cycle I 52.4% (Not Completed) to 81% (Completed) in cycle II2. The suitability of this research with the current research is that there is an increase in completeness from incomplete in cycle I to complete in cycle II (Indriani et al., 2019).

This research is the second previous research written by Nurhikmah, Gunawan, Syahrial Ayub Program (2018) with the title Effect of Problem-Based Learning Model Assisted Simulation Based Laboratory (SBL) on Physics Learning Outcomes of XI IPA Class Students SMAN 1 Montong Gading. To determine the effect of problem-based learning models assisted by simulation-based laboratory (SBL) in improving student learning outcomes, hypothesis testing is carried out. Hypothesis testing uses parametric statistics because the data is homogeneous and normally distributed. The hypothesis test used is the polled variance T-test. Based on the results of the calculation, it was found that $t_{count} > t_{table}$, namely 6.52> 2.00 at a significant level of 5% with degrees of freedom (dk) = n1 + n2 - 2 = 28 + 30 - 2 = 56. By the criteria for testing the hypothesis, namely tcount> t_{tabel}, H_0 is rejected H_a is accepted.3 The suitability of the data can be seen from the results of the T-test carried out which has the same hypothesis results (Nurhikmah et al., 2018).

Then this research is also the third previous research in a journal written by Haris Munandar, Sutrio, and Muhammad Taufik (2018) with the title The Effect of Problem-Based Learning Model Assisted by Animated Media on Critical Thinking Ability and Physics Learning Outcomes of Students of SMAN 5 Mataram in 2016/2017 Academic Year written by Haris Munandar et al. After testing the hypothesis using statistical tests using the t-test′, the $_{t\text{-count}}$ value is greater than t_{alpha} with a $_{t\text{-count}}$ value = 4.71; t_{alpha} = 2.03. Because tcount> t_{alpha} is 4.71> 2.03, then H_0 2 is rejected and H_a 2 is accepted. The advantage of this learning model is that there is a verse of the Qur'an as a reference for taking problems. This is very suitable to be applied to students with a background in boarding school because, with this learning model, the teacher can also get a more creative learning model to increase the attractiveness and interest in learning from these students. In addition to students getting physics material, these students get material and knowledge about the verses of the Qur'an which have meanings that are by the concept of physics (Munandar et al., 2018).

This research has broad implications for various stakeholders in education. For teachers, the findings encourage the development of skills in designing integrative learning models that combine science and religious values. Teachers are also expected to apply an interdisciplinary approach to teaching, increase creativity in linking science concepts with spiritual contexts, and adapt more contextualized problem-solving strategies. This emphasizes the importance of understanding the role of spiritual context in creating a more meaningful and relevant teaching and learning process for students. For curriculum developers, this study provides valuable insights for designing a more holistic and integrated curriculum. A multidisciplinary approach needs to be accommodated in the learning design, taking into account the integration of religious values in science subjects. In addition, curriculum developers can develop guidelines for implementing the integrated Problem-Based Learning (PBL) model and create a comprehensive assessment framework to measure the success of this learning model. For further researchers, this study provides a conceptual framework that can be used as a basis for similar studies. The findings open up opportunities for further exploration of innovative learning models, encourage cross-disciplinary comparative research, and develop more sophisticated research instruments. In addition, this research can be a starting point for longitudinal studies that test the effectiveness of learning models in the long term.

Despite making important contributions, this study has some limitations. Methodologically, the research sample was limited to 31 students with the geographical scope covering only one school in the Lombok region. The relatively short research period also limits the generalizability of the findings, which can only be applied to the specific context of Islamic-based schools. In terms of instruments, this study has not comprehensively tested the instruments, so there is a possibility of bias in the design. In addition, the instruments used have limitations in measuring in-depth psychological aspects, such as motivation and conceptual understanding, which are still quantitative. Theoretically, this study has not thoroughly explored the psychological mechanisms underlying the effectiveness of the learning model. The lack of existing references on the integration of PBL and Islamic studies is also a challenge, and the lack of comparative data with other learning models limits deeper analysis.

To overcome these limitations, future research is recommended to expand the sample coverage and develop more comprehensive research instruments. Comparative studies with different learning models should also be conducted, along with an in-depth exploration of psychological variables. In addition, testing the model on different subjects and education levels may provide greater insight. To maintain academic integrity, the study documented in detail the

procedures undertaken was open to criticism and suggestions for improvement, and published the raw data to enable independent verification. The researcher also explicitly explained the assumptions and limitations of the study and avoided over-generalizing the findings.

This study made a significant contribution to the development of an innovative learning model that integrates science and spiritual values. However, further exploration is needed to strengthen the findings and their application. Openness to continuous improvement and development is key to academic progress. Practically, this research encourages an integrated approach to education, improves the quality of science learning, and strengthens the connection between science and spiritual values. The findings provide a foundation for the development of more inclusive, relevant, and meaningful learning models for students in the modern educational context.

3.2 Discussion

Problem-based learning is one of many learning strategies that prioritize students on practical problems commonly found in everyday life as a foothold in learning or other words students learn through these problems. This learning model can be used as one of the learning models that can be applied to the learning process to know how much influence it has on student learning outcomes. With this problem-based learning model, it can be measured how much influence PBL has on student learning outcomes (Karttunen et al., 2025).

Meanwhile, according to Greseila Kaganang (2019), PBL is a learning model that encourages students to be able to apply critical thinking, problem-solving skills, and knowledge of concepts and content of real-world problems. Therefore, instruction in PBL is student-centered (Lee & Son, 2024). While the Integration of Islamic Studies is a combination or unification of Islamic concepts with other than that. Integration of Al-Islamic Studies incorporated into a learning process has a considerable influence. Therefore, with the Integration of Al-Qur'anic Studies, it can be measured how much effectiveness it has on the learning model that will be applied in research to attract student interest in learning. Especially on subject matter that is difficult to be interested in and liked (Kaganang, 2019).

Etymologically, integration is an absorption word from English integrate; integration is then adapted into Indonesian integration which means fusing or combining or uniting into a unified whole, namely integration. As for terminologically, the integration of science is the integration of separate sciences into a unified science, in this case, the unification of religious sciences with general sciences (Syam et al., 2023).

Psychological Theory Review Analysis

The effectiveness of learning is influenced by many factors, one of which is interest in learning and the perceived urgency of learning. It is also influenced by learning methods and emotional, psychomotor, and cognitive conditions (Sarwono & Meinarno, 2018). Based on the view of psychology, several factors can influence student behavior in learning. Some of these factors are:

a. Causes of Behavior: Influence of External Factors

The existence of this influence can be viewed from psychology. Where Psychology is a scientific study that seeks to understand the circumstances and causes of individual behavior in social situations (Baron & Byrne, 2005). The causes of behavior or things that affect student behavior in this study are external factors in the form of changing the learning model to problem-based Integrated Qur'anic Studies. Where changing this learning model changes student behavior, feelings, and thoughts when among other students during the learning process.

1) External factors affecting self-concept formation and change

Self-concept is a person's thoughts and feelings about himself, including something he might achieve in the future. Some of the things that shape and influence self-concept:

a) Experience

External factors in the form of changing the learning model to problem-based Integrated Islamic Studies create a new experience of learning. Students learn about a topic in a more fun and less monotonous way, and their minds are stimulated by the challenge of the problem to be solved. It also activates more senses besides hearing and seeing, namely psychomotor movements (Amir, 2022).

b) Environment

External factors in the form of changing the learning model to problem-based Integrated Islamic Studies create a richer environment. What is heard and seen becomes more varied than what is seen in a textbook and what is heard through a teacher. Other students' reactions and responses also enrich the environment more than one-way viewing and listening (Santi & Firdaus, 2023).

c) Self-assessment

External factors in the form of changing the learning model to problem-based Integrated Islamic Studies form a positive self-assessment. What is felt with this learning model becomes more positive because self-assessment is not only based on the ability to understand the text but also the practice carried out which is certainly easier and helps understanding of the text. In addition, the addition of the Integrated Islamic Studies factor in this learning mode greatly affects the feelings formed. The feeling that is formed becomes more motivated, more insightful, and calmer because it is close to the verses of the Quran (Bahari et al., 2023).

d) Role performed

External factors in the form of changing the learning model to problem-based Integrated Islamic Studies each student plays a role and does something to solve the problem challenges they choose.

2) External Factors Improving Self-Esteem

Self-worth is what we think and feel about ourselves, not what others think and feel about us. In the problem-based learning model Integrated with Qur'anic Studies, students feel more successful in understanding learning topics based on the problem so that they increase their thoughts and feelings of self-worth. Student's self-esteem can be formed freely when students can do *Problem Solving* in learning. Especially when witnessed by their peers in the classroom (Audina & Sari, 2023). One of the external factors that can increase students' self-esteem, namely the ability of the teacher approach to students who are adjusted based on their gender. This is because each gender has a different level of self-esteem. In this phenomenon, men tend to have a higher level of self-esteem when compared to women. So the approach taken by teachers to male students should be more extra when compared to women (Atika Nahda et al., 2024).

3) External Factors Improving Self-Efficacy

Self-efficacy is an individual's belief in their ability to manage and execute a set of actions required to achieve a particular goal. In an educational context, the problem-based

learning (PBL) model has significant potential in improving students' self-esteem. Through positive experiences, such as success in understanding the material learned, students can develop higher beliefs in their abilities. This increase in self-efficacy contributes to the emergence of positive emotions as well as increasing the effectiveness of observations during the learning process (Suana et al., 2022).

In addition, the element of verbal persuasion applied by educators during learning sessions also plays an important role in strengthening students' self-efficacy. Positive feedback and verbal support from teachers can help students feel more confident in facing academic challenges, thus creating a more productive learning atmosphere. Thus, the integration of the PBL model and the use of effective communication strategies can contribute to the development of students' self-efficacy, which in turn will improve their engagement and achievement in learning (Morin, 2022).

4) External Factors Improving Self-Motivation

Some external factors that can increase self-motivation in learning include the learning environment, social support, recognition and feedback, cultural context, availability of resources, appropriate challenges, and parental participation. A learning environment that is comfortable, well-organized, and supports collaboration encourages students to be more actively involved in learning. Adequate facilities, such as access to technology and teaching materials, also play an important role. In addition, positive relationships with teachers, peers, and family provide an essential emotional boost; when students feel supported, they are more likely to be motivated. Providing constructive feedback and recognizing achievements can boost students' self-confidence, so they feel valued and encouraged to continue learning (Deci & Ryan, 2014).

A cultural context that values education and collaboration affects student motivation, especially in an environment that supports discussion and cooperation. The availability of various learning resources, such as books and technology, helps students find ways of learning that suit their style, while challenges that are relevant and appropriate to students' ability levels can spark motivation. Parental involvement in education, such as supporting learning activities at home, also contributes to student motivation, as it shows that learning is a shared priority. By optimizing these factors, educators and parents can create an environment that is more conducive to increasing students' self-motivation in learning (Radulović et al., 2023).

b. Cognitive Theory in Problem-Based Learning

In addition to the discussion of student behavior factors. In psychology, some theories influence students' cognitive development. Sutarto (2017) explains that several figures put forward cognitive theories including:

1) Jean Piaget's Cognitive Theory

Jean Piaget suggests that learning will occur when there is individual activity interacting with the social environment and the physical environment. Individual growth and development is a social process. Individuals do not interact with their physical environment as bound individuals but as part of a social group. Piaget suggests that cognitive development has a very important role in the learning process. Cognitive development is a mental process. The mental process is essentially the *development of* the ability of logical reasoning (*development of the ability to respond logically*) (Burton & Radford, 2023). According to

Piaget, knowledge is formed by individuals through continuous interaction with the environment. There are four stages of cognitive development according to Piaget, namely: Sensorimotor stage which occurs at the age of 0-2 years, Pre-operational stage at the age of 2-7 years, Concrete operational stage at the age of 7-11 years and Formal operational stage at the age of 11 years and above. Some of the implications in Physics learning are that individuals can develop their knowledge can apply individualization in learning and can coordinate cooperatively with the teacher and their friends. This provides sufficient experience in improving students' intelligence in receiving material that has been given by the teacher (Pakpahan & Saragih, 2022).

2) J. S Bruner's Cognitive Theory

J. S Bruner's theory of cognition emphasizes the way individuals organize what has been experienced and learned so that individuals can find and develop their concepts, theories, and principles through examples found in their lives. Discovery learning is one of the cognitive learning models developed by Bruner. According to Bruner, meaningful learning can only occur through discovery learning that occurs in the learning process. Teachers must create problematic learning situations, stimulate students with questions, seek their answers, and conduct experiments. In this way, the knowledge acquired by the individual is more meaningful to him, easier to remember, and easier to use in problem-solving. The premise of this theory views humans as processors, thinkers, and creators of information (Levine, 2023).

According to Bruner, the intellectual development of children can be divided into three, namely: The pre-operational phase, between the ages of 5-6 years, then the concrete operation phase, at this 2nd level the operation is "internalized", meaning that in dealing with an individual problem it can only solve problems that are directly faced in reality, and the formal operation phase, at this level the child can operate based on hypothetical possibilities and is no longer limited by what took place before (Bruner, 2017).

According to Bruner, learning is a cognitive process that occurs within a person. There are 3 cognitive processes in learning, namely:

a) The process of acquiring new information.
b) The process of transforming the information received.
c) Test or evaluate the relevance and accuracy of knowledge.

There are several things that are very important to consider in learning related to Bruner's Cognitive theory, including the active participation of individuals and recognizing differences and the teacher as a tutor, facilitator, motivator, and evaluator (Sutarto, 2017).

4 CONCLUSION

The main findings of this study reveal that learning effectiveness is influenced by various factors, including student interest, teaching methods, emotional conditions, as well as psychomotor and cognitive aspects. The applied learning model emphasizes the importance of active interaction between students in groups, thus encouraging collaboration and collective problem solving. This approach not only enriches students' learning experience, but also creates a dynamic and participatory learning environment. In terms of statistical evidence, the T-test analysis showed significant results with a tcount of 5.06, which is greater than the ttable of 2.17. This indicates that the alternative hypothesis (Ha) can be accepted, which means that the applied learning model has a real influence on student learning outcomes. The increase in the average score from 68.89 to 81.93 in the experimental class further strengthens this finding, showing that this learning model is able to significantly improve students' understanding and achievement.

The advantage of this learning model lies in the use of Qur'anic verses as references in problem solving, which is in accordance with the background of pesantren students. This approach not only increases students' creativity, but also fosters higher interest in learning, because the learning material is felt to be more relevant and meaningful to their lives. Based on these findings, several recommendations can be proposed. First, teachers are advised to adopt the Islamic integrated *Problem-Based Learning* (PBL) model to create contextualized learning experiences and increase students' learning motivation. Secondly, curriculum developers need to consider an interdisciplinary approach in designing the curriculum, integrating values across disciplines to create a holistic and relevant learning design. Third, further research can explore the implementation of this model in other subjects, conduct continuous validation, and develop more adaptive innovative learning models.

The main contribution of this research is to bridge the gap between science and spirituality, improve students' conceptual understanding, and encourage higher learning motivation. The findings also provide a theoretical and practical foundation for the development of innovative learning models that can address contemporary educational challenges. The significance of this research lies in its ability to address current educational challenges, strengthen the link between science and spiritual values, and provide new perspectives in learning design. As such, this research not only positively impacts classroom learning practices but also opens up opportunities for more inclusive and meaningful curriculum development.

REFERENCES

Abidin, Z. (2017). Integrasi islam dengan fisika dan kimia. *Al-Afkar: Manajemen Pendidikan Islam*, *5*(2), 12–20.

Amir, F. (2022). Pengaruh Pendekatan Pembelajaran Berdasarkan Pengalaman dan Pengetahuan Awal Terhadap Pemahaman Konsep Fisika Peserta Didik Kelas XI IPA SMAN 2 Parepare. *Jurnal Fisika Papua*, *1*(2), 85–89. https://doi.org/10.31957/jfp.v1i2.109

Arikunto, S. (2014). *Prosedur Penelitian: Suatu Pendekatan Praktek* (14th ed.). Rineka Cipta.

Arikunto, S. (2021). *Penelitian Tindakan Kelas: Edisi Revisi*. Bumi Aksara. https://books.google.co.id/books?id=-RwmEAAAQBAJ

Atika Nahda, Depriwana Rahmi, Annisah Kurniati, & Suci Yuniati. (2024). Analisis Tingkat Self-Esteem Siswa Kelas XI MAS As-Salam Naga Beralih Pada Pembelajaran Matematika. *Jurnal Riset Pembelajaran Matematika*, *6*(1), 49–54. https://doi.org/10.55719/jrpm.v6i1.1106

Audina, R., & Sari, F. P. (2023). Self-esteem pada Remaja di UPT Rumah Pengasuhan Anak Wiloso Projo Kota Yogyakarta. *Jurnal Hawa : Studi Pengarus Utamaan Gender Dan Anak*, *6*(1), 88. https://doi.org/10.29300/hawapsga.v6i1.2580

Bahari, L. P. J., Asyari, A., & Nurjannah, N. (2023). Analysis of Teacher Assessment on the Effectiveness Of Problem-Based Learning in Improving Student Learning Outcomes at MA Putri Al-Ishlahuddin Kediri Lombok Barat. *KONSTAN - JURNAL FISIKA DAN PENDIDIKAN FISIKA*, *7*(02), 144–150. https://doi.org/10.20414/konstan.v7i02.156

Bahari, L. P. J., Bahtiar, B., & Kafrawi, M. (2021). Pengaruh Model Pembelajaran Berbasis Masalah Terintegrasi Islam terhadap Hasil Belajar Fisika Siswa Kelas XI IPA I Di MA Putra Al-Ishlahuddiny Kediri Lombok Barat. *Jurnal Ilmu Fisika Dan Pembelajarannya (JIFP)*, *5*(2), 40–47. https://doi.org/10.19109/jifp.v5i2.6929

Baron, R. A., & Byrne, D. (2005). *Psikologi sosial jilid 1* (R. Medya, R. Djuwita, & W. C. Kristiaji, Trans.; 10th ed.). Erlangga.

Bruner, J. (2017). *A Study of Thinking* (Second edition). Taylor and Francis.

Burton, A., & Radford, J. (Eds.). (2023). *Thinking in perspective: Critical essays in the study of thought processes*. Routledge.

Clarotta, A. U., & Renyaan, V. (2017). Pengaruh Model Pembelajaran Berbasis Masalah Terhadap Prestasi Belajar Fisika Siswa Kelas VIII. *Compton: Jurnal Ilmiah Pendidikan Fisika*, *4*(1).

Deci, E. L., & Ryan, R. M. (2014). *Intrinsic motivation and self-determination in human behavior*. Springer Science+Business Media.

Giancoli, D. C. (2005). *Physics: Principles with applications* (6th ed). Pearson Education Int.

H. Samiudin H. Samiudin. (2017). Peran Metode untuk Mencapai Tujuan Pembelajaran. *Jurnal Al-Murabbi*, *2*(1), 41–58.

Hosaini, H., & Akhyak, A. (2024). Integration of Islam and Science in Interdisciplinary Islamic Studies. *Jurnal Kepemimpinan Dan Pengurusan Sekolah*, *9*(1), 24–42. https://doi.org/10.34125/jkps.v9i1.337

Indriani, E., Yennita, Y., & Idrus, I. (2019). Peningkatan Hasil Belajar Peserta Didik melalui Model Pembelajaran Berbasis Masalah. *Diklabio: Jurnal Pendidikan Dan Pembelajaran Biologi*, *2*(2), 22–28. https://doi.org/10.33369/diklabio.2.2.22-28

Kafrawi, M. (2018). Peningkatan Hasil Belajar Siswa Melalui Pendekatan Pembelajaran Open-Ended pada Mata Pelajaran Fisika di Kelas VIII SMP Negeri 4 Lingsar Lombok Barat. *KONSTAN - JURNAL FISIKA DAN PENDIDIKAN FISIKA*, *3*(1), 48–57. https://doi.org/10.20414/konstan.v3i1.7

Kaganang, G. (2019). The use of problem-based learning to improve students' reading comprehension at the first grade students of Senior High School 1 of Middle Halmahera. *Langua: Journal of Linguistics, Literature, and Language Education*, *2*(1), 45–53.

Karttunen, E., Pesu, J., & Immonen, M. (2025). Cross-disciplinary perspectives on problem-based learning approach in public procurement in the European Union. *Journal of Purchasing and Supply Management*, 100992. https://doi.org/10.1016/j.pursup.2025.100992

Lee, J. S., & Son, H. K. (2024). The effects of problem-based learning integrated with the nursing process on clinical reasoning, communication skills attitude and nursing process competency among nursing students: A quasi-experimental study. *Nurse Education in Practice*, *81*, 104131. https://doi.org/10.1016/j.nepr.2024.104131

Levine, M. (2023). *A cognitive theory of learning: Research on hypothesis testing*. Routledge, Taylor et Francis Group.

Mailani, I. (2018). Inovasi Pembelajaran Pendidikan Agama Islam Berbasis Problem Based Learning. *Al-Uswah: Jurnal Riset Dan Kajian Pendidikan Agama Islam*, *1*(2), 129–137.

Morin, S. (2022). Systematic Literature Review: Self-Eficacy Matematis Siswa pada Tipe Kepribadian Extrovert dan Introvert dalam Pembelajaran Matematika. *ANARGYA: Jurnal Ilmiah Pendidikan Matematika*, *5*(1). https://doi.org/10.24176/anargya.v5i1.7192

Munandar, H., Sutrio, S., & Taufik, M. (2018). Pengaruh model pembelajaran berbasis masalah berbantuan media animasi terhadap kemampuan berpikir kritis dan hasil belajar fisika siswa SMAN 5 Mataram tahun ajaran 2016/2017. *Jurnal Pendidikan Fisika Dan Teknologi*, *4*(1), 111–120.

Muspiroh, N. (2013). Integrasi nilai Islam dalam pembelajaran IPA (perspektif pendidikan Islam). *Jurnal Pendidikan Islam*, *28*(3), 484–498.

Nurhikmah, N., Gunawan, G., & Ayub, S. (2018). Pengaruh Model Pembelajaran Berbasis Masalah Berbantuan Simulation Based Laboratory (SBL) Terhadap Hasil Belajar Fisika Peserta Didik Kelas XI IPA SMAN 1 Montong Gading. *Jurnal Pendidikan Fisika Dan Teknologi*, *4*(1), 16–22. https://doi.org/10.29303/jpft.v4i1.542

Pakpahan, F. H., & Saragih, M. (2022). Theory Of Cognitive Development By Jean Piaget. *Journal of Applied Linguistics*, *2*(2), 55–60. https://doi.org/10.52622/joal.v2i2.79

Radulović, B., Dorocki, M., Olić Ninković, S., Stojanović, M., & Adamov, J. (2023). The effects of blended learning approach on student motivation for learning physics. *Journal of Baltic Science Education*, *22*(1), 73.

Santi, N., & Firdaus, F. (2023). Pengaruh Lingkungan Keluarga Terhadap Keaktifan Siswa Dalam Proses Pembelajaran Pendidikan Agama Islam. *Jurnal Pendidikan Islam Muta'allimin*, *1*(1), 36–42. https://doi.org/10.25299/jpim.2023.vol1(1).14579

Sarwono, S. W., & Meinarno, E. (2018). *Psikologi Sosial* (2nd ed.). Salemba Humanika.

Suana, W., Wahyuningsih, E., Sesunan, F., Siregar, E., & K. Sagala, M. (2022). Perbandingan Self-Efficacy dan Hasil Belajar pada Pembelajaran Fisika Berbantuan Edmodo dan Line. *SILAMPARI JURNAL PENDIDIKAN ILMU FISIKA*, *4*(2), 87–97. https://doi.org/10.31540/sjpif.v4i2.1584

Sugiyono, S. (2017). *Metode penelitian bisnis: Pendekatan kuantitatif, kualitatif, kombinasi, dan R&D*. Alfabeta.

Sutarto, S. (2017). Teori Kognitif dan Implikasinya Dalam Pembelajaran. *Islamic Counseling: Jurnal Bimbingan Konseling Islam*, *1*(2), 1. https://doi.org/10.29240/jbk.v1i2.331

Syam, F. M., Aini, H., Samad, D., & Ardimen, A. (2023). Relevansi dan Integrasi Psikologi Religius dengan Konseling Islam (Motif, Sikap dan Perilaku). *Jurnal Fokus Konseling*, *9*(1), 39–47. https://doi.org/10.52657/jfk.v9i1.1917

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