Project-Based Learning Based on Islamic Values in Learning Tools on Bacteria Material in High School: An Efforts to Improve Students' Learning Motivation

Sulthan Syahril[1]

[1] Universitas Islam Negeri Raden Intan Lampung; sulthansyahril@radenintan.ac.id

ARTICLE INFO

ABSTRACT

Although students are usually self-motivated, external factors are still needed to increase their learning motivation. Pre-survey results indicate that schools do not use project-based learning models when teaching. This study aims to implement Islamic values-based project-based learning in learning materials on bacteria in high schools: an effort to increase student learning motivation. This research method is a Research and Development (R&D) using the ADDIE Model with a non-equivalent control group design to differentiate between the experimental and control classes through pretests and posttests. This research was conducted at SMA Muhammadiyah 2 Bandar Lampung during the 2022/2023 academic year. The population of this study was all tenth-grade students, with sampling carried out using cluster random sampling. The data collection technique used tests administered twice, namely pretests and posttests. Data analysis techniques to determine whether there is an effect of the use of the Project-Based Learning approach model on student learning motivation were carried out using the T-test and N-Gain. The results of the analysis indicate that the development of the Islamic values-based Project-Based Learning model is suitable for learning on bacteria material and has a simultaneous positive effect on increasing student learning motivation.

Corresponding Author:
Sulthan Syahril
Universitas Islam Negeri Raden Intan Lampung

1. INTRODUCTION

Learning is the process of interaction between students and educational resources within a learning environment. It is the assistance provided by educators to facilitate the acquisition of knowledge, mastery of skills and habits, and the formation of attitudes and beliefs in students. In other words, learning is the

process of helping students learn effectively. Quality learning depends heavily on the motivation and creativity of teachers. Highly motivated learning is supported by facilitating teaching through the use of learning styles or models (Agustina, Rustaman, Riandi, & Purwianingsih, 2018).

A learning model is a plan or pattern used as a guideline for classroom or tutorial learning. Learning models serve as a guide for designers and teachers in implementing learning. The choice of this model is heavily influenced by the nature and material to be taught, the objectives to be achieved in the teaching, and the ability level of the students. Furthermore, each learning model always has stages (syntax) that are developed by students under the guidance of the teacher. There are also differences between the syntax. These differences occur between the opening and closing, which teachers must understand for the learning models to be implemented successfully.

The world of education, or a teacher, must have ideas that can make the learning process fun and active. Therefore, teachers must understand appropriate learning models to motivate students to participate in each lesson. Teachers must not only provide material verbally or rely on lectures and PowerPoint presentations. Teachers must have diverse ideas. In this regard, education is inseparable from learning. Learning here refers to learning that connects teachers and students (Budiarti & Siburian, 2023).

Project-Based Learning, defined as Problem-Based Learning, is a type of learning model that involves students in an activity (project) to produce a product. Student involvement begins with planning, designing, implementing, and reporting the results of the activity in the form of a product and implementation report. This learning model emphasizes a long-term learning process. Students are directly involved with various issues and problems of everyday life, learning how to understand and solve real-life problems. It is interdisciplinary in nature and involves students as the primary actors in designing, implementing, and reporting the results of the activity (student-centered).

Project-based learning teaches specific skills for effective collaboration within a group. This learning model utilizes projects or activities as a learning tool to achieve competencies in attitudes, knowledge, and skills. During group work, group members' task is to achieve completion. This is a group investigation model, considered the most complex and difficult to implement in cooperative learning. The core of this learning process is not the project itself, but rather problem-solving and implementing new knowledge gained from project activities. Project-based learning emphasizes the various contextual issues that students will directly encounter during the projects or activities they undertake (Fitriana, Rahmatan, Evendi, Saminan, & Mentari, 2025).

This project-based learning model provides teachers with the opportunity to manage classroom learning by involving project work. This view implicitly states that project-based learning is a student-centered learning model that positions the teacher as a facilitator. This model requires students to possess strong communication skills and group process skills. In everyday life, motivation can be seen from a person's enthusiasm when engaging in an activity. A highly motivated student enthusiastically engages in the learning process to achieve maximum academic achievement.

In reality, current high school learning often lacks real-life connections. Therefore, educators' task is to address this issue by using teaching materials in the form of Student Worksheets (LKPD). These teaching materials are expected to address issues encountered in biology learning, which lack real-life connections. If educators use concrete examples from everyday life, students will easily understand the lessons, thereby improving their learning outcomes.

Regarding education and the implications of Islamic values in environmental education, a discussion of Islamic values regarding the environment and the development of environmental awareness in children is necessary. This is especially true considering that children's education is closely linked to values. In human life, there are things that are beneficial, thus ensuring the survival of an individual or society. Therefore, humans value things based on their usefulness or usefulness in life (Handayani & Suranto, 2025).

Based on this perspective, it is clear that Islamic values fundamentally provide a mutually supportive arrangement for various aspects of human life, such as social, political, economic, and cultural life. Thus, it is necessary to further explore what is referred to as Islamic values. Islamic values are essentially a

collection of life principles, teachings about how humans should conduct their lives in this world. Each principle is interconnected with the others, forming an inseparable whole. Values are also ideas or concepts about what a person thinks and considers important in their life. Through values, an object, person, idea, or way of behaving can be determined as good or bad. Values are also something inherent in a person, expressed and used.

However, in reality, these Islamic values have not been widely implemented in school learning materials. Even many religiously based schools still lack Islamic values in their learning materials. Observations at Muhammadiyah 2 Senior High School in Bandar Lampung revealed that the learning materials used included biology material based on the Curriculum 13 (K13). However, these learning materials were not yet based on Islamic values.

Furthermore, observations at Muhammadiyah 2 Senior High School in Bandar Lampung revealed that the learning process in grade 10, particularly in Biology, lacked variety in the teaching methods used by teachers, resulting in a lack of student enthusiasm. This learning process led to a lack of student engagement and motivation, resulting in passive learning, a lack of respect for teachers, and a poor understanding of the material presented. Biology, however, requires the use of appropriate learning models to encourage students to ask questions or express their opinions in front of others. Therefore, it is necessary to make changes to the learning model in the classroom, one of which is by using the Project Based E-learning Learning model.

Based on the learning outcomes above, it can be concluded that the learning outcomes of grade X students at SMA Muhammadiyah 2 Bandar Lampung are still relatively low. This is evident from the total number of students: only 34.9%, or 16 students, achieved mastery with a score of 70 or higher, while 62.6%, or 24 students, did not achieve mastery. Consequently, many students still have not reached the Minimum Completion Criteria (KKM) for the Natural Sciences (Biology) subject set by SMA Muhammadiyah 2 Bandar Lampung, which is 70.

Motivation is defined as a force acting on an organism, driving and directing its behavior. The concept of motivation is also used to explain differences in behavioral intensity. Learning motivation is a non-intellectual psychological factor. Learning motivation is the driving force within an individual to pursue a goal, namely to achieve success. Thus, motivation plays a strategic role in learning and during learning activities. To optimize its role, motivational principles must be implemented in learning activities, particularly in the delivery of bacteria material (Adriyani & Malik, 2022). Bacteria, also known as prokaryotes, are unicellular organisms lacking a nuclear membrane. They consist of cytoplasm surrounded by a plasma membrane and a rigid cell wall. Project-based learning utilizes projects or activities as learning tools to achieve competencies in attitudes, knowledge, and skills.

The purpose of this study is to examine Islamic-based project-based learning in secondary schools: an effort to improve student learning motivation. It is hoped that this study will find that the Islamic-based Project-Based Learning model is suitable for learning bacteria and has a simultaneous positive effect on improving student learning motivation.

2. METHODS

The research was conducted at Muhammadiyah 2 Senior High School in Bandar Lampung. The researcher chose Muhammadiyah 2 Senior High School because it is a private school in Bandar Lampung that combines science and technology with religious education. Based on the description above, the research title "Development of Islamic Value-Based Project-Based Learning Tools to Increase Student Motivation for Bacteria at the High School Level" was chosen. To support this research, the research activities were conducted in August 2023.

The research conducted in this study is a type of development research or Research and Development (R&D), which aims to develop a new product or improve an existing product. Ali Maksum stated that the term "product" can be interpreted as hardware or software, such as interactive learning models, guidance models, and so on.

This research is educational research and development (ERD) aimed at developing software in the form of learning tools for bacteria. Educational research and development encompasses the development process, product validation, and product trials. Through R&D, the researcher strives to develop a product that is effective for use in learning. Endang Mulyatiningsih stated that research and development aims to produce new products through a development process. Research and development products in education can include models, media, equipment, books, modules, evaluation tools, and learning devices such as curriculum and school policies. The products produced in this research include learning devices such as syllabi, lesson plans, and student worksheets (FALSYAH, 2024).

The non-test instruments in the study were a validation questionnaire and a student response questionnaire. The questionnaire used a likert scale to validate student responses. The likert scale is used to measure a person's opinion about an event or social phenomenon. The likert scale can be used as an appropriate method in data analysis research. Meanwhile, the Guttman scale is used to obtain a firm answer to a question. After the data from the likert and likert scales are collected, the data is then analyzed.

3. FINDINGS AND DISCUSSION

Islamic Values-Based Project-Based Learning (PjBL) learning tools involve students in an activity (project) to produce a product that incorporates Islamic values within the learning tools, packaged in an engaging manner to foster and enhance student learning motivation. The development of Islamic Values-Based Project-Based Learning (PjBL) learning tools utilizes PjBL indicators in creating the learning tools. The PjBL model has six phases: Phase 1: Start with the Essential Question, Phase 2: Design a Plan for the Project, Phase 3: Create a Schedule, Phase 4: Monitor the Student and the Project's Progress, Phase 5: Assess the Outcome, and Phase 6: Evaluate the Experience. In the "Start with the Essential Question" indicator, the teacher poses several essential questions aimed at providing focused and meaningful learning for students. Students are also given the opportunity to answer these essential questions in turn. In the Design a Plan for the Project indicator, implementation in the learning device involves students conducting a literature study related to the project to be undertaken. Afterwards, students determine the type of project to be created in groups and plan the project design with teacher guidance, ensuring that students understand the procedures for creating the project product to be worked on. In the create a schedule indicator, implementation involves the teacher and students making an agreement on the project creation schedule and assessment criteria that will be carried out together. Students also create a project completion schedule by taking into account the predetermined teaching and learning activity (KBM) time. Then, in the monitoring the Student and Project Progress indicator, implementation is carried out outside of class hours. The teacher actively monitors the realization of student development during the project implementation outside of class hours according to the predetermined schedule, and provides guidance if difficulties arise. In the assess the outcome indicator, implementation involves presenting the project along with the resulting product in class. The presentation of the product results and the documentation video are assessed by classmates using assessment sheets distributed by the teacher. The group with the highest score receives a prize given by the teacher. The final indicator is evaluating the learning experience. In its implementation, students and teachers analyze and evaluate the problem-solving process. Teachers also reinforce concepts and correct any misconceptions.

The development of Islamic value-based PjBL learning tools applies Islamic value indicators in the development of learning tools. The learning tools include three Islamic value indicators: moral values, faith values, and worship values. These three indicators are implemented in teaching and learning activities. In implementing the moral value indicator, teachers always open the lesson by greeting and greeting students. Furthermore, teachers encourage students to wear uniforms that comply with Islamic principles, namely covering the genitals for female students and wearing a hijab that covers the chest. Teachers also encourage students to greet each other and shake hands with members of the opposite sex. Implementing the faith value indicator, teachers encourage students to begin and end

everything with prayer, including before and after teaching and learning activities. Furthermore, teachers consistently relate relevant Quranic verses to the classroom material to foster faith in students. Furthermore, the worship value indicator is implemented by actively performing the Dhuha prayer in congregation before the start of the first period at school (Muhammad, 2020).

The development of Islamic value-based PjBL learning tools also applies learning motivation indicators. The developed learning tools consist of a syllabus, lesson plans, and student worksheets (LKPD), which contain five indicators of learning motivation: perseverance in learning, persistence in facing difficulties, interest and sharpness of attention in learning, achievement in learning, and finally independence in learning. Perseverance in learning can be seen from the active attendance of students in participating in teaching and learning activities at school. Then, the indicator of persistence in facing difficulties can be seen from the activeness of students in responding to questions posed by the teacher during the teaching and learning process. In addition, students together with the teacher analyze and evaluate the problem-solving process in the material presented. The indicator of interest and sharpness of attention in learning can be seen from the enthusiasm of students in teaching and learning activities, which is fostered by the teacher through explanations and delivery of material in an inspiring manner. For the indicator of achievement in learning, the teacher fosters student learning motivation by holding rankings on the assessment of assigned assignments. In addition, the teacher also holds a prize reception for students with the best scores. This is done to foster a spirit of achievement in students and efforts to achieve the best results. The independent learning indicator is demonstrated by students' active and serious participation in completing assignments outside of class. The assignment to create a product utilizing archabacteria and eubacteria was conducted outside of class, evidenced by a short video documentation created as creatively and informatively as possible to achieve optimal results.

The development of this Islamic-values-based PjBL learning tool used the ADDIE development model with five stages: analysis, design, development, implementation, and evaluation. However, this study was limited to the implementation stage. The researcher modified the development model as needed. In the first stage of analysis, the researcher conducted a field study and survey to determine the facilities available at SMA Muhammadiyah 2 Bandar Lampung. Interviews with biology teachers revealed that current learning relies heavily on the internet due to limited biology learning media. The internet is used primarily to present images or videos. Students also rely heavily on the internet, so when given assignments or practice questions, most of them use it. The learning process causes a lack of student activity and motivation to learn, resulting in students tending to be passive in learning, less respectful of teachers, and less understanding of the material presented. In fact, the subject of Biology learning really demands the use of an appropriate learning model during learning activities in order to increase the desire of students to ask questions or express their opinions in front of other students. Therefore, it is necessary to make changes to the learning model in the classroom, one of which is by using the Project Based Learning model.

A literature review was also conducted to seek references from various sources. The results of this literature review included previous studies. Research conducted by Dindha Amelia, Kusumaningrum, Elisabet, Siti Saenab, and Siti Zaerah indicated that the development of Islamic value-based PjBL learning tools is feasible as a learning tool because it has proven to have many advantages and can increase student learning motivation (Andriani, Masita, & Missouri, 2025).

The second stage of this research, the Design stage, involved selecting the learning tools to be developed: the Student Worksheet (LKPD), Syllabus, and Lesson Plan (RPP) for Islamic value-based PjBL, which can be printed and used offline. In the Design stage, a format and initial design were selected that were appropriate for the learning tools. This included the syllabus title, learning activities based on Islamic value indicators, the cover page of the LKPD on viruses and bacteria, competencies (KI) and basic competencies (KD), and student achievement indicators. The content of the PjBL-based LKPD consisted of the first step: determining the fundamental questions, the second step: creating the project design, the third step: developing the implementation schedule, the fourth step: project implementation, and the final step: concluding the conclusion.

In the third stage, Development, researchers developed project-based learning tools based on Islamic values for bacteria, including compiling materials on bacteria and viruses that had been revised by experts and practitioners. Validation by material experts yielded a score of 90.22%, and validation by language experts yielded a score of 98.12%. Furthermore, the Lesson Plan (RPP) validation achieved a validation score of 54 out of a maximum score of 60.

The fourth stage, Implementation, involved conducting a limited-scale test and a field test. The limited-scale test was conducted with 32 students using a student response questionnaire to determine the readability of the project-based learning tools based on Islamic values for bacteria and viruses. Some comments from students regarding the project-based learning tools based on Islamic values for bacteria included the attractive media display, the learning activities using the Student Worksheet (LKPD) in the learning tools were very helpful, and because access to the learning tools was not online, students found it easier to learn. The field test was conducted using an experimental group and a control group, each consisting of 25 students. An N-Gain test was conducted on the experimental and control groups to evaluate differences in learning achievement scores between students in the experimental and control classes using normalized achievement scores. The N-Gain test revealed a higher N-Gain score for the experimental group, at 50.08, compared to the control group, which had an N-Gain score of 27.21. This indicates that the experimental group experienced a more significant increase in learning motivation (Agustina et al., 2018). The feasibility of the Islamic values-based PjBL learning tool for increasing learning motivation achieved an average score of 90.22% from the material experts' assessment, with the criteria "Very Feasible," and 98.12% from the language experts' assessment, with the criteria "Very Feasible."

The results showed that the Islamic values-based Project-Based Learning model was effective in improving student learning achievement and learning motivation on the topic of Bacteria at SMA Muhammadiyah 2 Bandar Lampung. An independent t-test concluded that there was a difference between the average learning motivation of students in the experimental and control classes. Students who participated in learning with the Islamic value-based Project Based Learning Model showed a significant difference in terms of their learning motivation compared to students who participated in learning using conventional learning on the topic of Bacteria. Therefore, it was concluded that the Islamic value-based Project Based Learning Model had an effect on the learning motivation of class X students at SMA Muhammadiyah 2 Bandar Lampung.

Furthermore, the N-Gain test revealed a difference in the average achievement scores of students' learning motivation in the experimental and control classes. Students in the experimental class had higher n-gain scores than those in the control class. This indicates that the experimental class, using the Islamic values-based Project-Based Learning Model, experienced an increase in students' learning motivation. Based on the N-gain categorization, which is between 0.3 and 0.7 ($0.3 < g < 0.7$), students' learning motivation in the experimental class was categorized as moderate, while in the control class, students' learning motivation was categorized as low. These results lead to the conclusion that the learning process using the Islamic values-based Project-Based Learning Model can improve students' learning motivation (Budiarti & Siburian, 2023).

In this study, researchers investigated the effect of using the Islamic values-based Project-Based Learning Model on students' learning motivation. This study involved high school students in two groups: an experimental group using the Islamic values-based Project-Based Learning Model, and a control group using conventional learning methods. In this discussion, the researcher discovered several significant findings: Research on the effectiveness of Islamic-based Project-Based Learning (PjBL) on students' learning motivation can provide useful insights in an educational context. PjBL is a learning approach that emphasizes working on real-life projects to develop a deep understanding of the subject matter and practical skills. Being Islamic-based means that the projects students work on are designed with Islamic principles and values in mind.

Islamic values-based Project-Based Learning (PjBL) can significantly enhance students' learning motivation by integrating moral and spiritual dimensions into academic content. This approach not

only helps students develop a holistic understanding of the subject matter but also provides a relevant and meaningful context by connecting learning with Islamic principles, such as hygiene and health in the study of bacteria. Through active involvement in planning, implementing, and reflecting on projects, students gain a sense of ownership that fosters deeper understanding and intrinsic motivation. Collaborative activities within PjBL further develop essential communication and social skills, preparing students for real-world teamwork. Additionally, this method cultivates practical problem-solving abilities by encouraging students to identify real-life issues and design ethical solutions based on Islamic teachings. Reflection activities promote independent learning, while the application of religious values in tangible actions reinforces the significance of faith in daily life. Ultimately, Islamic values-based PjBL provides a holistic learning experience that combines academic knowledge, ethical reasoning, and critical skills, equipping students to face complex real-world challenges while fostering social responsibility and humanitarian awareness (Fitriana et al., 2025)

4.   CONCLUSION

Based on the results of research on the development of Project Based Learning learning devices based on Islamic values on bacteria material to increase the learning motivation of class X students of SMA Muhammadiyah 2 Prambanan, it can be concluded that the development of learning devices is carried out by adapting the ADDIE model which includes five stages, namely analysis, design, development, implementation, and evaluation. The effectiveness of this learning device in increasing student learning motivation is proven through the independent t test which shows a sig. (2-tailed) value of $0.000 < 0.05$, so that Ho is rejected and Ha is accepted. In addition, the N-Gain value in the experimental class is higher than the control class, namely 50.08 in the experimental class and 27.21 in the control class, which indicates that the experimental group experienced a more significant increase in learning motivation, so that this Islamic value-based learning device is declared more effective. The feasibility of this learning device also received a very good assessment, with an average result from the assessment of material experts of 90.22% and an assessment of language experts of 98.12%, both of which fall into the "Very Feasible" category.

REFERENCES

Adriyani, Z., & Malik, M. S. (2022). Formation Of The Entrepreneurial Spirit Of Prospective Teachers Through Project-Based Learning. *Jurnal Pendidikan Matematika Dan Ipa*, *13*(2), 254–276.

Agustina, T. W., Rustaman, N., Riandi, R., & Purwianingsih, W. (2018). Traditional Biotechnology Content As A Media In Engaging Students With System Thinking Skills. *Scientiae Educatia*, *7*(2), 197–217.

Andriani, A., Masita, M., & Missouri, R. (2025). Application Of Project Based Learning Method In Improving Students' Learning Motivation In Islamic Religious Education Lessons. *Journal Of Instructional And Development Researches*, *5*(2), 159–165.

Budiarti, R. S., & Siburian, J. (2023). Development Of Stem-Based Pjbl E-Student Worksheet To Foster Character Building. *Jurnal Penelitian Pendidikan Ipa*, *9*(11), 9818–9828.

Falsyah, A. Y. U. S. (2024). *Pengembangan Perangkat Pembelajaran Project Based Learning Berbasis Nilai Keislaman Untuk Meningkatkan Motivasi Belajar Siswa Pada Materi Bakteri Tingkat Sma*. Uin Raden Intan Lampung.

Fitriana, F., Rahmatan, H., Evendi, E., Saminan, S., & Mentari, M. (2025). Integration Of Religious Values In Biology Learning And Its Implications For Students' Environmental Awareness. *Jpbi (Jurnal Pendidikan Biologi Indonesia)*, *11*(2), 716–727.

Handayani, S., & Suranto, U. F. (2025). Project-Based Virus Enrichment Module Local Issue Context. *Journal Of Education Research And Evaluation*, *9*(1).

Muhammad, M. (2020). Promoting Students' Learning Motivation Through Project-Based Learning Using Muvizu In 21st-Century Education. *Kıbrıslı Eğitim Bilimleri Dergisi*, *15*(5), 899–908.