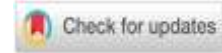




Product awareness and learning motivation on plantae topics through project-based learning with halal literacy



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ABSTRACT

In the ever-evolving world of education, an in-depth understanding of the learning process is essential. Lecture methods that tend to be monotonous often reduce students' motivation to learn, which in turn has an impact on decreasing learning outcomes, especially in plant material. Project-based learning has emerged as an alternative to increase students' interest in learning. This study aims to instill halal literacy awareness while influencing interest in purchasing halal products through a project-based learning approach on plantae material. A quantitative approach with a targeted survey design was used in this study. Thus, we used the purposive sampling technique to define 28 students as respondents. Data were collected through a questionnaire with a Likert scale (1-4). The analysis results show that the student awareness variable (X1) has a negative correlation with halal literacy project-based learning. Through multiple linear regression analysis, no symptoms of multicollinearity or heteroscedasticity were found. Halal literacy project-based learning contributed 30.8% to increasing students' awareness and interest in purchasing halal products. Thus, project-based learning is proven effective in increasing students' interest in learning, especially in plantae material.

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INTRODUCTION

Halal literacy has become an increasingly important concern in the era of globalization and the rapid growth of the food and beverage industry. This literacy not only includes food and beverage products but also covers the entire associated logistics chain. The provision of halal products must integrate various logistics services to meet the increasing demand for quality halal products (Karia, 2022; Masudin et al., 2020). For secondary school students, an understanding of



the concept of halal becomes increasingly relevant, especially when linked to learning materials such as *plantae* (plants) (Yuniarti et al., 2021). The *plantae* topic is an essential part of biology education, encompassing knowledge of plant diversity, classification, and the critical roles of plants in daily life. Understanding *plantae* deepens students' awareness of ecological functions and highlights plants' contributions as sources of food, medicine, and raw materials. However, students often struggle with the *plantae* topic, finding it complex and abstract, especially when connecting it to practical applications. Integrating real-world applications can make learning more meaningful, bridging the gap between theoretical knowledge and its impact on everyday choices.

In addition, halal literacy has gained increasing importance in today's global society, impacting consumer awareness across diverse communities, including students. Teaching halal literacy, specifically in the context of plant-based products, can raise students' awareness of ethical and religious considerations, particularly in selecting products aligned with their values. Despite its relevance, halal literacy in the context of *plantae* has been limited in educational settings. This study leverages project-based learning (PjBL) to integrate halal literacy within the *plantae* topic, offering a strategy to enhance students' product awareness and motivation. The PjBL provides an active, contextual learning experience that not only deepens understanding of *plantae* concepts but also encourages students to connect their learning to real-life applications by exploring and developing halal-compliant plant-based products.

Enhancing halal literacy through project-based learning is a strategic step to equip students with strong awareness and support for making informed purchasing decisions in the future. The importance of providing halal literacy to secondary school students is becoming an increasingly relevant topic, especially in the face of the growing trend of halal lifestyle. In line with religious principles, individuals who have an awareness of the importance of consuming halal products will try to follow this teaching as well as possible and avoid products that are not by halal provisions (Ambali & Bakar, 2013, 2014).

In education, halal literacy plays an important role, especially in the context of 21st-century education that has been promoted by the government to change the mindset of students in a more critical and relevant manner (Amalia & von Korfflesch, 2021; E. Retnowati et al., 2018). This approach is supported by a learning model that integrates collaboration between students and teachers to form skills that benefit students' future. One of the main responsibilities of educators is to improve and train students' conventional or underdeveloped ways of thinking. This challenge is often faced in various parts of Indonesia. Amalia & von Korfflesch (2021) and Retnowati et al., (2018) stated that the quality of a country's education can be measured by the quality of its graduates, so it is important to provide education that can develop competent human resources. Effective learning must be tailored to the situation and needs in the field. However, many teachers still face obstacles and challenges in the learning process. Cayubit (2022) emphasizes the importance for teachers to create a pleasant learning atmosphere to increase students' learning engagement and motivation.

Students' low interest in learning can be seen from their lack of preparation, such as not bringing textbooks, and not paying attention to the teacher in class, and there are passive students without writing or doing the assigned tasks (Atifnigar et al., 2022; Rahimi & Zhang, 2022). Innovation is an important key in facing these challenges, especially in learning. Project-based learning at the secondary school level provides opportunities for students to develop practical skills, critical thinking, and problem-solving abilities (de Oliveira Biazus & Mahtari, 2022; R. Retnowati et al., 2020). Especially in plant material, such as the production and processing of plant products, halal literacy is an important aspect. Understanding the halal principles in choosing and producing plant products provides a strong foundation for students to make informed and responsible purchasing decisions (Wiyono et al., 2022). Halal literacy awareness among high school students

not only affects their current purchasing decisions but also plays a role in shaping sustainable consumption behavior in the future.

With a deep understanding of the concept of halal, students can become more critical and conscious consumers of the source and quality of the plant products they purchase. This knowledge not only helps them in choosing products that are in line with personal values and beliefs but also contributes to the development of a sustainable halal industry. Therefore, educators and curriculum developers must integrate halal literacy into project-based learning, especially in plant material. Equipping students with the knowledge and skills needed to understand and select halal plant products will provide long-term benefits for them as smart consumers. In addition, this step also supports the promotion of a quality and sustainable halal industry in the future.

Halal literacy is not only limited to the halal label but also includes the entire processing process and ingredients used in the manufacture of the product. Public understanding must go beyond the mere introduction of the halal label, emphasizing that the halalness of a product also depends on its production process by Islamic law (Hasyim, 2022; Johan & Plana-Casado, 2023). Therefore, education on halal literacy is very important, especially in providing students with a clear understanding of what is allowed and not allowed according to Islamic rules and laws. The role of teachers in integrating halal literacy is crucial. Morrison et al. (2021) state that teachers have the responsibility to guide the development of students toward more positive changes. Wardani et al., 2020 also added that the teacher acts as a motivator, providing encouragement that supports the development of student activities during the learning process in the classroom.

The objective of this study is to examine the effects of implementing project-based learning combined with halal literacy on students' product awareness and learning motivation in the context of plantae. Specifically, this research aims to determine whether this instructional approach enhances students' understanding of plantae concepts while fostering ethical awareness in their selection of halal plant-based products.

RESEARCH METHODS

Research Design

This study employs a quantitative design, utilizing numerical-based data processing to objectively analyze and interpret the findings. The study adopts a descriptive-quantitative approach to systematically capture and analyze data patterns across various measurable variables. This research type is chosen due to its strength in providing statistical insights and its ability to generalize findings to a larger population. Through quantitative analysis, the study aims to identify specific trends, correlations, and potential causal relationships within the data, offering robust support for evidence-based conclusions.

Population and Samples

The research sample was obtained through a purposive sampling technique, involving 28 students of class X IPS I from one of the private high schools in Bandung City. This sampling method was selected to ensure that the participants met specific criteria relevant to the research objectives. By focusing on a targeted group, purposive sampling allows the researcher to gather in-depth insights from students who are representative of certain characteristics essential for the study, such as academic background and level of exposure to the study material. The research was conducted at the end of the odd semester of the 2022/2023 academic year, precisely in December.

Instruments

Students' awareness and interest in purchasing halal-certified products were measured using a questionnaire tailored to the needs of each project group. The questionnaire was measured using a Likert scale with intervals of 1-4, where a score of 4 indicates "Strongly Agree" (SS), a score of 3



for “Agree” (S), a score of 2 for “Disagree” (TS), and a score of 1 for “Strongly Disagree” (STS). Pada kuisiner ini, terdapat tiga indikator utama yang dikaji meliputi Students' Halal Awareness in Project Learning (8 statement), The Role of Halal Product Labels in Project Learning (7 statements), Product Purchase Decision Results (3 statements) yang kemudian dikembangkan menjadi 18 statement.

Procedures

The research, conducted on biology subjects focusing on plantae, employed a project-based learning approach to enhance student's understanding of both biological concepts and halal literacy. After studying the plantae material, students were assigned a project titled *“Exploring the World of Halal Science: A Journey Unveiling Nature's Wonders”*, which aimed to integrate science with halal awareness. The project began with discussions, educational videos, and quizzes on halal concepts, followed by field observations and experiments such as planting seeds and analyzing food labels to identify halal products. Activities included simulated shopping, group discussions, and hands-on experiments like making yogurt, generating energy from fruits, and composting organic waste. The results were presented through exhibitions, written reports, and oral presentations. At the end of the lesson, students completed a halal literacy questionnaire to assess their understanding. This project combined spiritual values with scientific inquiry, fostering critical thinking, environmental awareness, and innovative skills.

Data Analysis

Data analysis in this study was conducted using SPSS version 26 software. The analysis began with descriptive statistical analysis to provide an overview of the general tendencies and distribution of each variable. This included calculating measures such as the mean, median, mode, standard deviation, variance, and range, as well as examining frequency distributions. This descriptive analysis helped to identify basic patterns in the data and detect any potential outliers, providing a foundational understanding of the dataset before moving on to further analysis.

Following the descriptive analysis, the study employed a multiple linear regression method to investigate the relationships between the independent and dependent variables. To ensure the validity and reliability of the regression model, several prerequisite tests were conducted beforehand. First, a normality test was performed to check whether the residuals were normally distributed, as this is an essential assumption in regression analysis. Next, a multicollinearity test was carried out to examine correlations among the independent variables; this step was necessary to avoid inflated variance in the regression coefficients that could weaken the model. Lastly, a heteroscedasticity test was conducted to verify that the residual variance was consistent across all levels of the independent variables, ensuring that the model could make accurate predictions. These preliminary tests ensured the robustness of the regression model and provided a solid foundation for the subsequent analysis, allowing for reliable and valid interpretations of the relationships among the study variables.

RESULTS

The first research result relates to students' halal awareness during the implementation of project-based learning. The observation data which illustrates the level of students' awareness of halal literacy in the context of project learning is presented in Table I.

Table I displays how students internalize the concept of halal literacy during the learning process, which reflects the extent to which their understanding develops after the application of this method. Based on the research results shown in Table I, the highest average score was obtained on the indicator of the importance of providing halal and thayyib ingredients in product manufacturing during project-based learning. This shows that students have a good understanding



of the urgency and importance of using halal ingredients in the product manufacturing process, according to their respective groups. On the other hand, the lowest average score was seen in the indicator of purchasing materials that are not certain of their halalness. Although the mean score for this indicator is 2.93, if it is increased to 3, then the interpretation of most respondents is “Agree,” which indicates that despite some differences in opinion, most students understand the importance of choosing ingredients that are guaranteed to be halal.

Table I. Students' Halal Awareness in Project Learning

| No. | Statement | Mean | SD |
|-----|--|------|------|
| 1 | Before designing a menu product, ensure that the project uses halal tools and materials | 3.75 | 0.69 |
| 2 | Selection of halal ingredients in the menu products made | 3.43 | 1.05 |
| 3 | Purchase materials that are halal in making products for learning projects | 3.82 | 0.54 |
| 4 | Understand halal concepts to be applied in project learning | 3.75 | 0.63 |
| 5 | Will not buy materials whose halal status is uncertain for making products | 2.93 | 1.44 |
| 6 | Knowing the importance of providing halal and thayyib products in project-based learning | 3.96 | 0.19 |
| 7 | Designing materials for products with attention to cleanliness as well | 3.86 | 0.44 |
| 8 | Understanding to consume halal and thayyib food and drinks | 3.89 | 0.31 |

The results of the analysis related to the role of halal labels on raw materials used by each group show that halal labels are an important factor in ensuring the halalness of products. All indicators obtained an average value of 3 presented in Table 2.

Table 2. The Role of Halal Product Labels in Project Learning

| No. | Statements | Mean | SD |
|-----|--|------|------|
| 1 | Results of the Role of Halal Product Labels in Project Learning | 3.36 | 1.17 |
| 2 | Not paying attention to the halal label on the ingredients in making the product | 3.07 | 1.22 |
| 3 | Through planning, we will process the materials properly and correctly according to Islamic law. | 3.82 | 0.47 |
| 4 | The absence of a halal label on the ingredients in the manufacture of the product is not a problem. | 3.21 | 1.18 |
| 5 | By shopping for ingredients that have the halal logo on the packaging, you will be assured that the product will also be halal. | 3.82 | 0.47 |
| 6 | Don't buy if the material doesn't have a halal logo for making products in this project study | 3.14 | 1.16 |
| 7 | Providing halal labels on the packaging and posters of products that will be served during project learning to convince consumers. | 3.46 | 0.63 |

Table 2 shows that, indirectly, each group has paid attention to and considered the halal label or logo when shopping for their group's needs. Thus, these groups have shown good



awareness of the importance of ensuring the halalness of products through observing halal labels, which play a role in ensuring that the products used are by halal principles.

The analysis shows that overall, respondents have a good awareness of the importance of halal literacy in the context of project-based learning. The overall mean of 3.41 indicates a high level of agreement among respondents regarding the importance of halal labeling and practices in learning activities. The role of halal labeling in the selection of ingredients used by students is significant, as shown in Table 2. All indicators show that students pay attention to halal labeling when preparing ingredients for their projects, with the highest mean score of 3.82 on statements related to processing ingredients by Islamic law and the role of halal logos in ensuring the halalness of products. This shows that students understand well the importance of adhering to halal principles during the processing of ingredients.

On the other hand, the lowest mean score of 3.07 on statements related to attention to the halal label indicates that although students are aware of the importance of the halal label, their attention to it may not be as strong as other aspects of halal literacy. This suggests that there is still room to improve students' awareness or knowledge of the importance of checking the halal label on every product they use.

To understand participants' perceptions and level of satisfaction regarding the application of halal principles in a learning project, several statements focusing on the use of halal-labeled ingredients, the decision to purchase halal ingredients, and satisfaction with the implementation of the project were evaluated. This analysis aims to assess the extent to which participants agree with the importance of halal aspects in the learning process and the extent of their satisfaction with the integration of halal values from the initial stage to product presentation. Based on the results obtained, general trends and consistency of the participants' opinions can be identified, which will be further explained in the following analysis section. The Data is presented in Table 3.

Table 3. Product Purchase Decision Results

| No | Statements | Mean | SD |
|----|---|------|------|
| 1 | Requires halal-labeled ingredients to be purchased and processed into halal products. | 3.71 | 0.65 |
| 2 | The decision to purchase halal materials for the products in this learning project is the right decision | 3.86 | 0.52 |
| 3 | Satisfied with project learning that pays attention to the halalness of products from ingredients to presentation | 3.86 | 0.58 |

Based on the data analyzed, there are three statements evaluated by respondents regarding the halal aspect of project learning. The mean rating for the first statement, the need to use halal labeled ingredients in the purchasing and processing process, was 3.71 with a standard deviation of 0.65. This indicates that most respondents tend to agree that halal ingredients are an important component of the project, although there is considerable variation in respondents' responses, as evident from the relatively larger standard deviation compared to the other statements.

For the second statement, which asked whether the decision to buy halal ingredients was the right choice, the mean rating reached 3.86 with a standard deviation of 0.52. This indicates that respondents strongly agreed that the decision was the right course of action, and the responses were more uniform or consistent, as seen from the lower standard deviation.

The third statement related to the level of satisfaction with project learning that pays attention to the halalness of the product, from ingredients to presentation, also obtained a mean of 3.86 with a standard deviation of 0.58. This reflects that in general, participants were satisfied with

the attention paid to the halal aspect of the project, with slightly more varied responses than the second statement, but still showing a high level of consistency.

DISCUSSION

This section presents the results of research on students' awareness of project-based learning, particularly related to the concept of halal literacy. Student awareness in the context of project-based learning is a crucial factor that can influence the success of the learning process, especially in increasing active engagement and deeper understanding of the material taught. Based on the analysis of the data collected, we will discuss the level of students' awareness of project-based learning, the factors that influence it, and its impact on students' interest and understanding. This discussion will also link the findings with previous research to evaluate whether the results obtained are in line with previous findings or provide new contributions in the context of 21st-century education.

Further analysis shows that all indicators related to halal awareness in making project products illustrate that most students have a good understanding of the importance of choosing halal-certified staples and supporting ingredients. For example, materials such as fruits used in the project, whether self-grown or obtained from other gardens are confirmed to be halal by students. Students' initial knowledge of halal literacy is an important foundation in determining the quality of the products they will consume and use (Anam et al., 2018; Othman et al., 2016; Sholihin et al., 2023; Wibowo et al., 2022).

Furthermore, analysis of the mean and standard deviation of each statement provides a more detailed picture of student awareness. Respondents showed strong agreement on the indicator of the importance of ensuring the halalness of ingredients and tools before designing products, with a mean of 3.75 and a standard deviation of 0.69, indicating low variation in judgment. The indicator regarding the selection of halal ingredients in products also obtained a mean of 3.43 with a standard deviation of 1.05, indicating a greater difference in opinion among respondents. The statement with the highest mean (3.96) and lowest standard deviation (0.19) was about the importance of providing halal and thayyib products, indicating a very strong level of agreement among students.

Overall, students showed high awareness of the importance of halal literacy in project-based learning. This is not only evident from their assessment of the halalness of the ingredients, but also from their understanding of the importance of halal literacy in a broader context, including the contribution to consumption behavior that is in line with their values and beliefs. With this awareness, students not only participate in effective learning but also contribute to the development of halal literacy as a relevant global issue in various sectors, including education.

In the context of evolving halal literacy, students' awareness of the importance of halal products in the learning process reflects their increased understanding and knowledge of halal products. This development is a positive step, considering that halal literacy plays an important role in providing insight into the source, quality, and halalness of products consumed or used in everyday life. In an educational setting, an understanding of halal literacy can contribute to shaping students' sustainable attitudes and behaviors regarding product selection. This understanding also strengthens students' beliefs about the importance of consuming food or drinks that comply with halal principles. As explained knowledge about the importance of consuming halal products can influence the acceptance or rejection of product purchase decisions (Anggraini & Dewanti, 2020; Djunaidi et al., 2021; Fauziah & Al Amin, 2021; Sujono et al., 2023). Therefore, students' recognition of the importance of halal products in the learning process indicates a growing concern for halal literacy in the educational context. This increased awareness is expected to strengthen students' knowledge of halal principles and influence their decisions to choose and use products more responsibly.

The role of the halal label is very important in the planning of projects undertaken by students. The halal label provides clear information about the halal status of a product, which greatly helps students in choosing materials that are to their values and beliefs. By paying attention to the halal label, students can ensure that the materials used not only comply with Islamic law but also meet the correct processing standards. This understanding also encourages students to learn appropriate processing techniques, such as the separation of halal and non-halal ingredients, the use of separate equipment, and maintaining hygiene and sanitation during the processing process.

The awareness of halal literacy and the use of halal labels in learning projects not only develop students' practical skills but also shape them into responsible consumers and producers. The products that students produce in activities such as the learning bazaar not only meet halal standards but are also acceptable to a society that pays attention to halal principles. Through this learning, students directly contribute to the development of halal products that comply with sharia, which is an important foundation in supporting a sustainable halal industry.

In the implementation of project-based learning in schools, the decision to purchase halal-compliant ingredients has a significant impact. Purchasing ingredients with the halal logo gives students a better understanding of the importance of keeping products halal and applying halal principles. They will understand that choosing materials with the halal logo is a crucial step in respecting religious beliefs and convictions. Muslim consumers need to recognize the halal logo before making a purchase, given the wide variety of halal logos that exist. This awareness will shape students into smarter and more responsible consumers in choosing materials for their learning projects (Aqdas & Amin, 2020; Borzooei & Asgari, 2016; Muhamad et al., 2017; Zaini & Yoyo, 2021).

In addition to awareness, the selection of materials with the halal logo also has an impact on the quality of the products produced. By choosing materials that meet halal requirements, students can ensure that the products processed in learning projects also meet halal standards. This gives students confidence that the products they produce are by religious values and can be accepted by people who adhere to halal principles. In addition, the use of ingredients with the halal logo also helps avoid the risk of contamination or mixing of non-halal ingredients that can damage the quality and halalness of the product. Therefore, the selection of halal logo materials in school learning projects has a positive impact on ensuring the quality, halalness, and acceptability of the products produced.

Overall, respondents showed a strong tendency to agree that the halal aspect was very important in this project, both in terms of the selection of materials and their satisfaction with the implementation of the learning. The variation in responses, especially on the first statement, suggests that there are different views among a small number of respondents on the importance of using halal-labeled ingredients. However, the high level of consensus on the second and third statements confirms that most participants felt this was the right decision and were satisfied with the implementation of the project that took into account halal aspects.

Based on the results of the analysis, most respondents showed a high level of satisfaction with the application of halal-labeled ingredients in project learning. The high average rating, especially on statements related to the decision to purchase halal materials (3.86), indicates that respondents consider it important to ensure the halalness of the materials used in the learning process. These results are in line with research that public awareness of halal products is increasing, especially among students. The importance of halalness not only as a religious obligation but also as part of product safety and hygiene (Aslan, 2023; Elias et al., 2016; Golnaz et al., 2010; Hasan, 2019).

In addition, the high level of satisfaction with learning that takes into account halal aspects from ingredients to presentation (mean 3.86) indicates that participants appreciate the thorough

application of halal principles in this project. This can be compared with the research from Tucker (2017) and Warda et al. (2024) who found that in the context of project-based education, attention to detail in halal processing can increase learner satisfaction, because they feel that their religious values are properly applied in an academic context. A similar level of satisfaction was also found in Rahman's study, where participants felt more engaged when value and ethical aspects were considered in learning.

However, while most respondents showed agreement with the importance of using halal ingredients (mean 3.71), there was variation in responses (SD 0.65), indicating a more diverse view among participants. Some studies, such as the one by Kurniawati & Savitri (2020), suggest that this variation could be due to differences in individuals' level of knowledge and understanding of the concept of halal. Some participants may feel that products that do not have an official halal label but are believed to comply with halal standards, are sufficiently accepted in the learning project.

In addition, the lower standard deviation in the second statement (0.52) indicates a higher consistency in the view that the decision to choose halal ingredients is appropriate. This result is consistent with Wibowo et al. (2022) research, which showed that when participants have a clear understanding of the importance of halal certification, they tend to be more consistent in the decisions they make, both in the context of product purchases and in the context of education.

Overall, the findings of this study show that attention to halal materials and processes in project learning is highly appreciated by participants. This is in line with global trends that show increasing awareness of the importance of halal products, not only among consumers but also in education. Other studies have also confirmed that the integration of religious values such as halal in academic activities can increase learner engagement and satisfaction, reinforcing the application of relevant principles in daily life.

Based on Table 3, it can be seen that each group involved in purchasing ingredients for product manufacturing has a good awareness of the importance of halal labels or logos on products. This awareness shows an understanding that the halal label plays an important role in ensuring the halalness of the ingredients used. This reflects a sense of moral responsibility in choosing and determining ingredients that are by halal principles. This awareness is then translated into real behavior which becomes the basis for each group in making decisions about the ingredients to be processed. In general, decision-making based solely on rationalization without a strong faith belief can trigger negative behaviors such as consumerism and individualism (Assuad, 2020; Bolis et al., 2017; Lee et al., 2010).

In the context of this study, the relationship between halal awareness and the decision to purchase ingredients to make products was tested through multiple linear regression analysis. Before conducting the regression test, the data obtained needs to fulfill classical assumptions. The normality test results show a significance value of 0.200, which is greater than 0.05, indicating that the data is normally distributed. This is also evident from the histogram which shows a normal curve and from the Normal Q-Q Plot, where the data points are scattered around the diagonal line, confirming the normal distribution of the data.

A good multiple linear regression equation does not contain symptoms of multicollinearity or heteroscedasticity. In this study, the results show that the tolerance value for both variables, namely awareness (X1) and product purchase decision (X2), is 0.369, which is greater than 0.10. This indicates the absence of multicollinearity symptoms. In addition, the heteroscedasticity test is carried out using a scatterplot graph, which shows that the data distribution is evenly distributed. This result is supported by the significance value in variable X1 of 0.289, which is greater than 0.05, and the significance value in variable X2 of 0.722, which is also greater than 0.05. Thus, it can be concluded that there are no symptoms of heteroscedasticity, so the multiple linear regression

equation in this study has met the classical assumptions. Furthermore, equation I shows a linear regression of halal awareness and product-giving.

$$Y = -0.214x_1 + 0.122x_2 + 87.923$$

The regression correlation of variable XI (halal awareness) on project learning shows a negative correlation, which means that the higher the students' halal awareness, the lower the observed success rate of project learning. Although this seems contrary to expectations, this phenomenon can be explained by several factors. Most learners may have understood the concept of halal literacy, but there are still some who tend to ignore it because they view project learning tasks as an obligation to obtain grades, not as an effort to apply halal principles in practice. This is consistent with the questionnaire findings which show that although almost all students have basic knowledge of halal literacy, not all of them consider it important to apply it seriously in their projects.

This negative correlation could be caused by several factors that affect the understanding and application of halal literacy in schools. The first factor is the lack of in-depth understanding of halal literacy in the school environment. Although students know what halal literacy is, they may not fully realize its positive impact in choosing and using halal ingredients in project learning. This superficial understanding could lead to students not fully engaging in the application of halal principles during the learning process. The second factor is the lack of resources and access to relevant information related to halal literacy. Schools may not provide adequate learning materials on halal literacy, such as appropriate books or teaching materials, so students do not get enough information to understand the importance of halal application in their projects.

The third factor is the influence of culture and social environment. If students are in an environment where halal literacy is given less attention or not considered important, then their awareness of halal literacy will also be low. On the contrary, if students' environment supports the understanding and application of halal literacy, they tend to be more committed to applying it in project learning. Nonetheless, these three factors are only part of the possible causes of the observed negative correlation, and further research is needed to identify specific factors that affect students' halal awareness in more depth.

In contrast, the regression correlation of variable X2 (product purchase decision) against project learning shows a positive correlation. This means that the better students are at making the right decisions regarding the purchase of materials needed for their projects, the higher the results or grades they obtain in halal literacy-based project learning. The analysis results show an R square value of 0.308, which means that the halal awareness variable (XI) and product purchasing decisions (X2) together provide an influence of 30.8% on the success of halal literacy-based project learning. Thus, the remaining 69.2% is influenced by other factors not included in this study, such as teaching methods, individual skills, or learning environment.

This study shows that, although halal awareness is important, other factors such as proper decision-making in selecting materials also play a big role in the success of project learning. This provides insight that halal literacy needs to be better integrated in the educational context so that students not only understand the concept but are also able to apply it correctly in daily activities.

CONCLUSION

Halal literacy-based project learning in plantae material has significant potential to increase students' halal awareness, especially in understanding the role of halal labels in selecting ingredients to be processed into products. This conclusion is based on the observation that although there is a negative correlation between students' halal awareness and the success of project learning, interesting results show that students with initially low levels of halal awareness are still able to



make wiser purchasing decisions and by halal principles after participating in the learning. This means that despite their limited initial awareness, halal literacy-based project learning is effectively able to improve their understanding of the importance of choosing halal ingredients and encourage them to make more informed decisions in the process of purchasing ingredients. Thus, halal literacy-based project learning not only serves as a means to improve students' understanding of halal literacy but also encourages students to apply this knowledge in everyday life, especially in the context of decision-making. This shows that a learning approach that integrates halal literacy can be an effective strategy in shaping a generation of smarter and more responsible consumers in choosing and using halal products. Furthermore, the development of halal awareness through projects that focus on hands-on practice, such as in plantae material, can provide a more in-depth and contextualized learning experience for students. In addition to learning theory, students are encouraged to engage in decision-making processes that are relevant to their lives, such as choosing materials that comply with halal principles. Therefore, project-based learning that prioritizes halal literacy not only increases students' awareness but also strengthens their ability to become conscious consumers of the importance of halalness in the products they use.

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