

The Development of Electronic Student Worksheets (E-LKPD) Integrated with Islamic Values on Human Respiratory System Material at Grade VIII

Nabila Luthfidia Tamara^{1)*}, Nasrul Hakim²

^{1)*2)} Biology Education, IAIN Metro, Indonesia

*Correspondence email: luthfidia23@gmail.com

Article History	:	
Received	:	Mei 08, 2024
Revised	:	June 10, 2024
Accepted	:	June 16, 2024
Published	:	June 19, 2024

ABSTRACT

The present study aims to develop, validate, and analyze teacher's and students' responses to a product of electronic-student worksheets (i.e. *elektronik-Lembar Kerja Peserta Didik* or e-LKPD) which are integrated with Islamic values on a biology subject at grade VIII regarding the topic of human respiratory system. This research was carried out in two different places, namely at the Biology Study Program of IAIN Metro where the e-LKPD product was designed by the researchers and was validated by material experts and media experts at the university, and at SMP Negeri 1 Way Jepara to test the e-LKPD product (on a teacher and a small group of students). The present study is a development study using the ADDIE model, which consists of analysis, design, development, implementation. and evaluation stages. The results show: 1) the e-LKPD integrated with Islamic values at the learning topic of human respiratory system involves an understanding of the organs, mechanisms and disorders that occur in the human respiratory system which is connected and viewed from Islamic principles (application of Islamic moral and ethical values within the act of breathing); 2) The results of the validity test for the material aspect of the e-LKPD were 86% which is categorized as very good meaning the material can be placed on the e-LKPD template that was to developed; 3) The results of the validity test for the aspect of the e-LKPD media were 90% which is categorized as very good allowing the e-LKPD media arrangement to be firmly established; 4) The teacher's response to the e-LKPD being developed was 93% which is categorized as very feasible, and the students' response to the e-LKPD being developed was 94% which is categorized as very practical, implying that the e-LKPD materials and its media are already suited to the needs of the learning process, so it can be concluded that the developed e-LKPD integrated with Islamic values can be used in the biology learning activities at grade VIII about the human respiratory system.

Keywords : *e-LKPD integrated with Islamic values , Human Respiratory System*

INTRODUCTION

The development of electronic-student worksheets (i.e. *elektronik-Lembar Kerja Peserta Didik* or e-LKPD) is one of the innovations in education which aims to increase the effectiveness of learning in the digital era (Suryaningsih & Nurlita, 2021). E-LKPD combines student worksheets (LKPD) with digital technology, enabling higher interactivity and easier accessibility for students. Compared to the traditional paper worksheet, students can have a better learning engagement when the worksheet is digitalized and is more interactive (Zhang et al., 2023). With the electronic version of worksheets, students can access learning materials

online, complete assignments digitally, and get direct feedback from teachers. Not only this facilitates the teaching and learning process, but also it opens up space for the development of more personalized and adaptive education according to the needs of each student (Putra & Pratama, 2023). The use of e-LKPD in learning has been widely applied, with no exception for biology learning in which its usage has improved significantly in recent years. E-LKPD on biology learning allows teachers to provide abstract material to be concrete and interactive, and makes it easier for students to access it via digital devices (I. P. Sari et al., 2019).

Furthermore, the use of e-LKPD can be varied according to learning needs. In an Islamic context, the use of e-LKPD can integrate Islamic values in its content, encouraging students to be more active in improving their knowledge and skills in biology, without neglecting good attitudes and behavior based on Islam. Such use of technology if combined with appropriate teaching practices can cultivate and strengthen the Islamic values in a school (Mahsusi et al., 2024). The integration of Islamic values in biology learning activities can be carried out by paying attention to perspectives of ethical, moral, and Islamic values that are relevant to the biology subject. This can be done in various biology materials, one of which is the human respiratory system.

The learning topic on the human respiratory system at grade VIII includes anatomical structure, organ function, respiratory processes, the role of the lungs, as well as disorders and prevention of the human respiratory system. This material is classified as an abstract topic because the material cannot be seen directly, so the delivery of the material is carried out with the help of a media to help students easily understand the material. Then the material on the human respiratory system can be correlated with Islamic values in learning activities, which involve emphasis on, for example, appreciating Allah SWT's creations, staying healthy as a form of responsibility, and understanding the importance of being grateful for the blessings of breathing, including an explanation of the respiratory system (providing material that introduces the respiratory system and the magnificence that reflects the greatness of Allah SWT), interactive activities (through questions or discussions about how humans can be grateful for the blessings of breathing given by Allah, as well as the responsibility to maintain a healthy respiratory system), videos or animations (using videos or animations that illustrate the breathing process with narratives of Islamic values, such as maintaining health as an act of worship), and links to Islamic sources (inserting links to verses of the Quran or hadiths related to breathing or health, to provide a deeper Islamic context).

Based on the results of interviews with a science teacher at SMP Negeri 1 Way Jepara, it is known that the biology learning process regarding the human respiratory system always requires more time than the other topics. The teacher must be more active in raising students' interest and motivation to learn. This is likely due to the material on the human respiratory system that is relatively abstract and has many respiratory mechanisms that students must understand, so it requires more concentration in studying it. Besides, the teacher has been using textbooks and PowerPoint slides whose material focuses on explanations and pictures which apparently becomes one of the triggers for students' lack of interest in learning material about the human respiratory system.

The researchers proposed a solution to appropriately resolve the mentioned problems, namely by updating the contemporary learning media, which is in line with the latest educational development, namely developing electronic student worksheets (e-LKPD) which is expected to help students easily understand learning topics. The developed E-LKPD contains various features in the form of concrete visualizations that are interesting for students to foster their curiosity about studying the human respiratory system, as well as building their self-confidence in solving problems (Amalia et al., 2022). Besides, the e-LKPD is created by

integrating Islamic values to enhance students' manners and faith during the learning activities. The e-LKPD was created using the Canva application and presented through a simple booklet, which when it is accessed, will display learning materials and visualizations that help students understand the materials when studying independently.

Research regarding the development of e-LKPD in human respiratory system material has continued to develop to increase the effectiveness of learning, including research using an interactive approach, which emphasizes the development of interactive e-LKPD, utilizing features such as animation and simulation. Similarly, research on curriculum adaptation, which focuses on adapting e-LKPD in the context of local needs and relevant cultural values, has also been emerging. However, research on developing e-LKPD material on the human respiratory system that is integrated with Islamic values is a unique thing to do, considering the needs of faith and technology for students that must be simultaneously encouraged. Therefore, the researchers carried out this research with the aim of developing, validating and analyzing teachers' and students' responses to the e-LKPD product which is integrated with Islamic values in grade VIII for biology science material regarding the human respiratory system.

RESEARCH METHODS

A. Types of research

The present study belongs to the Research & Development (R & D) study, which is used to make a product, then test the effectiveness of the product (Okpatrioka, 2023).

B. Research Location and Time

This research was carried out in two different locations with specific objectives, namely:

1. Biology Education Study Program at IAIN Metro with the aim of designing and testing the validity of an electronic student Worksheet (e-LKPD) product which is integrated with Islamic values on biology material about the human respiratory system at grade VIII;
2. SMP Negeri 1 Way Jepara, with the aim of testing the effectiveness of the e-LKPD being developed, by looking at the response of the science teacher and grade VIII students after using the e-LKPD.

The research was carried out in December, an odd semester of the 2023/2024 academic year.

C. Research Design

The present study used the ADDIE model to create an e-LKPD integrated with special Islamic values on a biology topic about the human respiratory system at grade VIII. The ADDIE model consists of five development stages, namely:

1. Analyzing learning needs and student characteristics. This involves identifying learning objectives, understanding the human respiratory system material, as well as assessing the technological capabilities available in the school and the primary needs of students. This analysis helps formulate plans that are appropriate to the learning context;
2. Designing the structure and content of an e-LKPD. This includes organizing material on the human respiratory system logically, developing interactive formats, selecting appropriate visualization media, and preparing learning activities that support the achievement of learning objectives. Good design will ensure that the e-LKPD can communicate information about the human respiratory system clearly and effectively

to students;

3. Development involves implementing a design that has been prepared into a functional product. This includes content creation, coding, functionality testing and integration of interactive elements. After the e-LKPD has been developed, at this stage, researchers will need the help of experts/validators to validate the e-LKPD being developed;
4. Implementation in a real learning context. This stage is carried out after the e-LKPD is valid and can be used to be tested in real conditions. At this stage, researchers need teachers and students as product test subjects;
5. Evaluation the effectiveness of the e-LKPD in achieving learning objectives. Evaluation is carried out through a variety of methods, including collecting feedback from students and teachers, measuring achievement of learning objectives, and analyzing usage and interaction data. The evaluation results are used to improve and improve the e-LKPD so that it is more effective in supporting the learning process.

D. Technique of Data Collection

The present study used several data collection techniques in the form of observation, interviews, and surveys, with the following explanation.

1. Observation techniques, implemented at the analysis stage in the ADDIE model to observe:
 - a. Technology readiness in the school to assess the technological infrastructure available in schools, including internet access, hardware (smartphones, computers), and software needed to implement e-LKPD;
 - b. Involvement of the teacher and students in the use of technology for learning. These observations will be helpful in determining the training strategies and support needed;
2. Interview technique, carried out at the analysis stage in the ADDIE model. Researchers interviewed:
 - a. The science teacher of Grade VIII, to understand the teacher's perspective on student needs, challenges in teaching, and how to use technology to improve learning;
 - b. Grade VIII students, to gain insight into students' preferences in learning, how comfortable they feel with technology and opinions about an e-LKPD that can help them in the learning process;
3. Survey technique, used to test the validity of the making of the e-LKPD by material and media experts, and to test the effectiveness of the e-LKPD by the science teacher and grade VIII students, which was carried out at the implementation and evaluation stages in the ADDIE model.

E. Research Instruments

Research instruments involve observation schemes, interview questions, and a survey. The observation and interview were carried out with an open-ended concept to obtain all initial data needed at the analysis stage in the ADDIE model. Meanwhile, the survey technique used 2 types of questionnaires, namely a questionnaire to test the validity of e-LKPD products, and a questionnaire to test the effectiveness of e-LKPD products, with the following details.

Table 1. Matrix of Validity Test from The Material Experts

No.	Criteria	Indicator
1.	Aspect of material appropriateness	Completeness of the material
		Depth of the material
		Broadness of the material
2.	Aspect of language appropriateness	Accuracy of the sentence structures
3.	Aspect of learning	Suitability with the students' development
		Communicative
		Dialogic and interactive

(Rizalia & Wuriani, 2023).

The validity of the material included in the e-LKPD must be tested so that it can be used appropriately. In this case, the e-LKPD contains material on the human respiratory system tested by lecturers of Biology Education Department of IAIN Metro.

Table 2. Matrix of Validity Test from The Media Experts

No.	Criteria	Indicator
1.	Aspect of media appropriateness	Convenience of media operations
		Media display
2.	Aspect of graphics and design appropriateness	Cover design of the e-LKPD
		Content design of the e-LKPD

(Setyo & Pribowo, 2018)

The media used in making e-LKPD must be tested for validity so that it is interactive and easy to use in learning activities. In this case, the design of e-LKPD media was tested by lecturers of Mathematics Education department who teach Technology, Information and Communication (ICT) courses at IAIN Metro.

Table 3. Instrument Matrix for Teachers' Responses

No.	Criteria	Indicator
1.	Aspect of material appropriateness	Completeness of the material
		Depth of the material
		Broadness of the material
2.	Aspect of language appropriateness	Accuracy of the sentence structures
3.	Aspect of learning	Suitability with the students' development
		Communicative
		Dialogic and interactive
4.	Aspect of media appropriateness	Convenience of media operations
		Media display
5.	Aspect of graphics and design appropriateness	Cover design of the e-LKPD
		Content design of the e-LKPD

(Syam et al., 2024)

E-LKPD which has been tested by validating the material and the media is implemented for science teachers to determine the significance of the e-LKPD before being given to students. In this case, the person who tested its significance was the science teacher of grade VIII SMP Negeri 1 Way Jepara.

Table 4. Instrument Matrix for Students' Responses

No.	Criteria	Indicator
1.	Aspect of material appropriateness	Completeness of the material
		Depth of the material
		Broadness of the material
2.	Aspect of language appropriateness	Apprehensible sentence structures
3.	Aspect of learning	Suitability with self development
		Communicative sentences
		Dialogic and interactive sentences
4.	Aspect of media appropriateness	Convenience of media operations
		Media display
5.	Aspect of graphics and design appropriateness	Cover design of the e-LKPD
		Content design of the e-LKPD

(Syam et al., 2024)

E-LKPD that has been tested its significance to the grade VIII science teacher, then the e-LKPD was used in activity learning material system respiration in humans at grade VIII students of SMP Negeri 1 Way Jepara.

F. Techniques of Data Analysis

Data analysis interprets the results of e-LKPD product development which is integrated with Islamic values on human respiratory system material, with the following criteria and categories using a Likert scale.

Table 5. Likert Scale

No.	Category	Value Scale
1	Excellent	5
2	Good	4
3	Fair	3
4	Poor	2
5	Very poor	1

(Giana & Lutfi, 2019)

In the present study, a Likert scale was used with a scale of 1-5, where 1 is the lowest scale and 5 is the highest scale. The Likert scale is used to measure opinions, attitudes and perceptions of material experts, media experts, teachers, and students regarding the e-LKPD being developed.

The results of the Likert scale entries will be analyzed to measure their significance, both by material experts, media experts, teachers, and students, using the following formula.

$$P = \frac{F}{N} \times 100\%$$

Information:

P : Percentage from questionnaire responses

F : Total score obtained

N : Maximum number of scores

The percentages were interpreted in the following criteria and categories.*

No.	Percentage	Interpretation
1	$0\% \leq x \leq 20\%$	Very Poor
2	$20\% < x \leq 40\%$	Poor
3	$40\% < x \leq 60\%$	Fair
4	$60\% < x \leq 80\%$	Good
5	$80\% < x \leq 100\%$	Excellent

* Note: The use of interpretation is modified to data requirements. In the validity test, the interpretation is very invalid to very valid. In the teacher's significance test, the interpretation is very infeasible to very feasible. In the significance test for students, the interpretation is very impractical to very practical.

(Dewi et al., 2022).

RESULTS AND DISCUSSION

The development of electronic student worksheets (e-LKPD) was carried out using the ADDIE model, with the following results.

1. Analyzing, there are three stages carried out at the analysis stage, namely performance analysis, needs analysis and curriculum analysis).
 - a. A performance analysis was carried out in relation to the learning media that has been used by the teacher in the classroom with the aim of investigating problems to find possible solutions by developing new learning media. In this case, the researchers found that the science teacher of grade VIII at SMP Negeri 1 Way Jepara was accustomed to using image media both on LKPD and PowerPoint slides;
 - b. A needs analysis was carried out to determine the learning media needed by students in the biology learning process regarding for the topic of human respiratory system. Based on the findings, it is known that students are interested in electronic media or utilize technology in their activities;
 - c. A curriculum analysis was used with the aim of finding out the curriculum used in the class where the present study took place. Grade VIII of SMP Negeri 1 Way Jepara has implemented an independent curriculum - the latest national curriculum, where material on the human respiratory system is in odd semesters. This material is very dense, especially regarding the respiratory mechanism in humans, as well as disorders that occur in the human respiratory system. This learning topic also discusses the respiratory organs in the human body, which cannot be seen easily. As a result, the teacher has always taught abstract learning topics .
2. Designing the e-LKPD. At this stage, the researcher focuses on the content of the material, starting from the suitability and depth of the material on the human respiratory system, consistent layout in the use of symbols and good layout, as well as sentences and visualization displays that are attempted to be communicative and interactive, so that the e-LKPD can become teaching material that can be studied independently. This is in line with the opinion of (Kurniawati et al., 2015) which states that if media or teaching materials are designed completely by considering all the factors that determine success, then the media or teaching materials can act as independent learning materials for students;
3. Development. This stage requires validators from material and media experts to assist in the preparation of e-LKPD, so that the final development results are as what expected by the researchers, teacher, and students. Results of the validity test from the material experts can be seen in Figure 1.

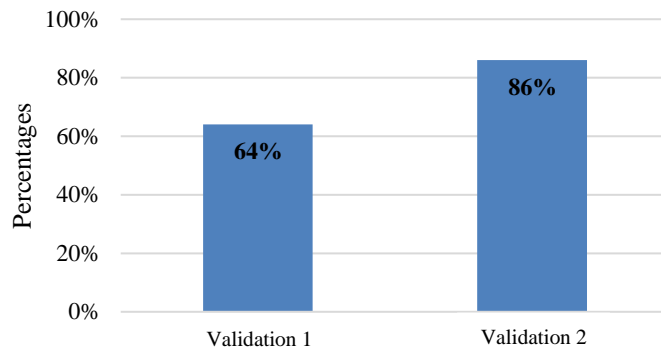


Figure 1. Percentage of Validity Test Results from the Material Experts

Figure 1 explains that validation of material aspects was carried out twice with one revision. The first validity test obtained a score of 64%, categorized as Good. Based on the results of the analysis, it is known that the aspects that still need to be revised are the cover design and contents of the e-LKPD, which do not yet represent the integrating Islamic values. Besides, the aspect of convenience in using the media still needs to be revised because it is still considered impractical for grade VIII students, thus, it is considered ineligible to proceed to the product trial stage. This is in line with (Firmansyah et al., 2020) which state that integrating character education (containing religious values) into teaching material in the form of student worksheets must be intact and complete to prevent misinterpretation/misunderstanding and degradation of students' religious values. Additionally, (Suryani et al., 2023) study suggests that including Islamic values as a whole in a learning activity (including the use of student worksheets) might be encouraging for students' habitual behavior in which they are able to develop their own potential. After revision, the results of the second validity test obtained a score of 86% which was categorized as very good, and the validators confirmed that the content of the e-LKPD material was valid and could be continued. Furthermore, there are validity test results from media experts which can be seen in Figure 2.

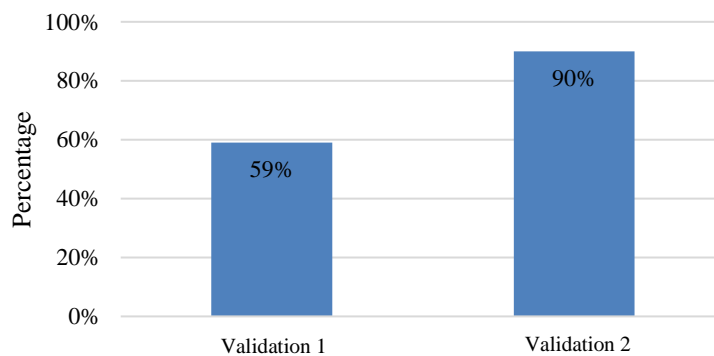


Figure 2. Percentage of Validity Test Results from Media Experts

Figure 2 explains that validation of media aspects was carried out twice with one revision. The first validity test obtained a score of 59%, categorized as Fair. Based on the results of the analysis, it is known that the aspect that still needs to be revised is the depth of material aspect, which does not yet represent the integrated Islamic values. For example, the e-LKPD content on the human respiratory system contains sub-material on organs, mechanisms and disorders that occur in the human respiratory system. In the first product, the integration of Islamic values was only written in the sub-material of disorders of the human respiratory system, therefore, it was deemed incomplete and not suitable to proceed to the product trial stage. This is in line with (Husna et al., 2022) which argue that learning

media must make it easy for educators to control learning material, create accuracy in presenting the material, while increasing educators' self-confidence, in order to create enjoyable learning conditions and situations. Additionally, (Taboy et al., 2023) suggest that the design of learning media is important because it attracts and requires students to want to learn and understand the learning material more easily. After revision, the results of the second validity test obtained a score of 90% categorized as very good, and after being reassessed by the validators, the content of the e-LKPD media was confirmed valid and could be continued;

4. Implementation, a trial of e-LKPD was carried out on the biology science teacher and a small group of 20 students in grade VIII of SMP Negeri 1 Way Jepara, who had studied the topic of the human respiratory system. This trial phase aims to see the response of the teacher and students towards the e-LKPD, the results of which can be seen in Figure 3.

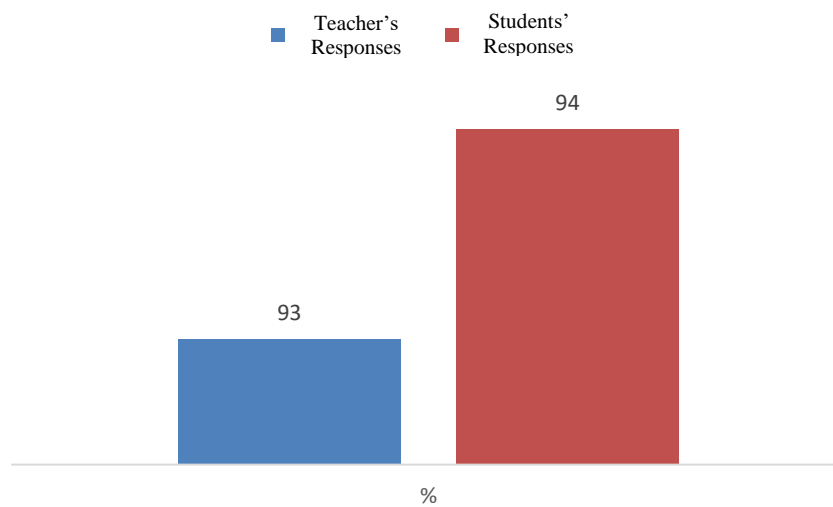


Figure 3. Percentage of Teacher and Student Responses in Using e-LKPD

The final product of the e-LKPD integrated with Islamic values was implemented in a learning activity specifically arranged for studying the topic on human respiratory system. After learning and using the e-LKPD, the percentage of the teacher's response was 93% which is categorized as very suitable for use, and students gave a percentage response of 94% which is categorized as very practical for use when studying the topic of human respiratory system. Good results from teacher and student responses indicate the feasibility of the e-LKPD product. (Sari et al., 2020) state that a decent LKPD (i.e. student worksheets) for use is a student worksheet that represents all the learning activities, where it contains interactive elements and is content-directed which enables students to learn independently or in groups. (Suryani et al., 2023) also supports that student worksheets integrated with Islamic values should be made simple and interactive making it practical and easy for students to use, so that students are interested in learning in order to improve their respective faith and technological abilities;

5. Evaluation, intended to measure the feasibility of the e-LKPD product that has been developed. This stage was carried out using inferential analysis of the pretest and posttest scores given to a small group of grade VIII SMP Negeri 1 Way Jepara. However, due to time constraints, the final stage of the ADDIE model has not been implemented, so the feasibility of the e-LKPD product integrated with Islamic values has not yet been identified; the present study was, however, limited to only the significance of the e-LKPD product.

CONCLUSION

Based on the results and discussion, several conclusions can be drawn as follows: Electronic learning media - Student Worksheets (e-LKPD) integrated with Islamic values in a learning topic of biology subject about the human respiratory system were developed using the ADDIE research model which consists of five stages, namely: 1) analysis, which finds students' learning problems and needs regarding the topic of human respiratory system; 2) design, e-LKPD integrated with Islamic values on the topic of human respiratory system includes an understanding of the organs, mechanisms and disorders that occur in the human respiratory system in terms of Islamic principles (application of Islamic moral and ethical values within the acts of respiration); 3) development, the results of the validity test from the e-LKPD material aspect were 86% which is categorized as very good implying the learning material can be placed on the e-LKPD template that was to be developed. Meanwhile, the results of the validity test for the e-LKPD media aspect were 90% which is categorized as very good allowing the e-LKPD media arrangement to be firmly established; 4) implementation, the teacher's response to the e-LKPD being developed was 93% which is categorized as very feasible, and the response of students to the e-LKPD being developed was 94% which falls into category of very practical, implying that the e-LKPD materials and its media are already suited to the needs of the learning process; 5) evaluation, which was unfortunately not carried out due to time constraints.

IMPLICATIONS AND SUGGESTIONS

Research on the development of electronic student worksheets (e-LKPD) integrated with Islamic values on the topic of human respiratory system provides an effective and efficient contribution to biology education, namely e-LKPD which was created to provide practicality in learning the human respiratory system allowing the biology science teachers can explore other abilities of students. However, due to time constraints, this research has not been able to expose the feasibility of the e-LKPD that has been created and developed, so it is hoped that this can be done in subsequent research, and expectantly reaching to the stage of implementation in a biology learning of large-scale classes.

ACKNOWLEDGMENTS

The authors would like to express gratitude to SMP Negeri 1 Way Jepara for allowing the research to take place for testing a product of electronic-student worksheet (e-LKPD) which is integrated with Islamic values on the topic of human respiratory system.

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