Bioedukasi
Jurnal Biologi dan Pembelajarannya
Vol. 23 No 2, June 2025, page 294-304
e-ISSN: 2580-0094; p-ISSN:1693-3931
DOI: 10.19184/bioedu.v23i2.53726
bioedukasi.jurnal.unej.ac.id/index.php/BIO

Development of a Wahdatul Ulum-Based E-Magazine Learning Media on Digestive System Material for Grade XI Senior High School Students

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Article Info
Article history:
Received June 17, 2025
Revised June 24, 2025
Accepted June 24, 2025

Keywords: (A-Z)
Digestive system,
E-Magazine,
Wahdatul Ulum

ABSTRACT
This study aims to develop an E-Magazine learning media based on *Wahdatul Ulum* for the topic of the human digestive system for Grade XI high school students. The background of the research stems from the low student interest in biology subjects and the lack of integration of Islamic values in science education. The method used is Research and Development (R&D) with the 4D model (Define, Design, Develop, Disseminate), limited to the Develop stage. Validation was conducted by experts in content, media, and *Wahdatul Ulum*, resulting in a "very valid" rating with an average score of ≥87%. Practicality testing showed the media was highly practical, with scores of 96% from teachers and 94% from students. Effectiveness was evaluated through N-Gain analysis, yielding a score of 0.77 (high category), indicating a significant improvement in student learning outcomes. Thus, the developed E-Magazine is considered valid, practical, and effective as a learning medium that enhances students' learning interest while harmoniously integrating Islamic values. Validity reflects the quality of the content and design, practicality indicates the ease of use and attractiveness of the media, while effectiveness is demonstrated through improved learning outcomes. All of these achievements align with the initial goal of the development, which was to present a digital medium that not only delivers scientific content but also strengthens spiritual values through the *Wahdatul Ulum* approach.

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1. INTRODUCTION

In the 21st century, the education sector has undergone a significant transformation driven by the adoption of digital technologies, making learning more interactive, collaborative, and technology-oriented while shifting away from conventional teaching methods. The rapid advancement of information and communication technology (ICT) has reshaped instructional strategies through the use of digital media such as video animations, game-based applications, augmented reality (AR), and virtual reality (VR) to enhance student collaboration, digital literacy, and critical thinking skills (Faiza et al., 2024). Education plays a crucial role in human life. Without education, a region, nation, or country cannot progress. The educational process is continuous and lifelong, serving as a fundamental component in human survival and development (Fau et al., 2023). The digital era has also impacted various aspects of life, including how the younger generation perceives and processes information. Generation Z has grown up in an environment saturated with modern technology and unlimited access to information. While this condition offers vast opportunities to broaden their knowledge, it also presents new challenges, particularly in aligning scientific knowledge with religious values. The abundance of digital content that does not explicitly connect spiritual and scientific aspects may influence Generation Z's perspective on the relationship between science and faith (Hasibuan & Khairani, 2025).

Wahdatul Ulum is an integrative concept that unifies scientific knowledge and religious teachings into a single entity derived from God, with the ultimate aim of worshiping Him and contributing to the well-being of humanity (Harahap et al., 2022). In educational settings, the Wahdatul Ulum paradigm seeks to combine secular knowledge with religious principles to create a more comprehensive and holistic understanding. The goal is to eliminate the dichotomy between general and religious knowledge by fostering a more open and unified

educational model (Tanjung et al., 2023). This learning approach emphasizes not only the transmission of information but also the development of students' character and spirituality. Through the application of the Wahdatul Ulum paradigm, education aspires to produce graduates who are not only competent in their academic disciplines but also possess strong moral values and the ability to integrate religious principles into their daily lives (Dasopang et al., 2021).

An e-magazine based on the concept of Wahdatul Ulum serves as a digital learning medium in the form of an interactive and engaging electronic journal that presents academic content by integrating general scientific knowledge with Islamic principles (Sari & Adlini, 2024). Wahdatul Ulum itself is a paradigm that harmonizes religious knowledge (naqliyah) and rational or empirical knowledge (‘aqliyah), not as conflicting entities, but as complementary components of a unified system of knowledge derived from the One Almighty God. The integration of Islamic values into the learning process is most appropriately implemented in educational institutions with an Islamic orientation. However, observations indicate that many schools, including SMA Mamiyai Al-Ittihadiyah, have not yet fully adopted this approach. Discussions with biology teachers and students reveal that biology instruction at the school has not been effectively connected with relevant Qur'anic verses. The teaching materials used fail to engage students with religious aspects, as the learning process remains centered on conventional biology content without the inclusion of Islamic literature. Teachers tend to rely solely on textbooks, with minimal use of diverse learning media. Students perceive these textbooks as monotonous, particularly due to the predominant teaching methods of reading and note-taking. Consequently, students obtain knowledge only from the prescribed books, limiting their understanding. Furthermore, teachers have noted a lack of enthusiasm among students during classroom activities, resulting in many students failing to meet the Minimum Mastery Criteria (KKM), which has been set at a score of 70.

The results of interviews and questionnaire analyses regarding students' needs in biology education reveal that students have a low interest in reading textbooks. Additionally, the use of instructional media such as PowerPoint has not been optimized, as the content often consists of dense text that students find unengaging. As a result, many students perceive biology as a tedious and unappealing subject. They also expressed dissatisfaction with the visual presentation of learning materials, which lack aesthetic appeal and interactivity. Students tend to prefer a variety of media that incorporate visual elements, such as images, which aid in better comprehension and retention of information. To address these issues, it is essential to develop efficient and meaningful learning media that can enhance the overall quality of teaching and learning processes. One potential solution is the implementation of e-magazine-based learning media, which offers a more interactive, visually engaging, and accessible alternative to conventional instructional tools.

Instructional e-magazines are digital media in the form of electronic magazines, designed as innovative and effective tools to support the learning process. These e-magazines can be accessed through various electronic devices such as computers, tablets, and smartphones, either online or offline after being downloaded. Their main advantage lies in their flexible accessibility, enabling both students and teachers to engage with learning materials anytime and anywhere, thus enhancing the efficiency and effectiveness of education in the digital age (Damayanti, 2016). E-magazines incorporate various multimedia elements such as images, videos, animations, and interactive links, which help make learning more engaging and easier to comprehend. These interactive contents have the potential to increase students' interest and motivation in learning. In addition to promoting active learning, the digital format of e-magazines contributes to environmental sustainability by reducing paper usage. Furthermore, content distribution and updates can be carried out more efficiently without the need for reprinting (Srikandi et al., 2019; Fuad et al., 2020).

Numerous studies have previously developed biology-based e-magazines. For example, Suryani (2016) developed E-Magazine Biore focusing on reproductive system disorders and diseases; Sundari (2017) created a biology e-magazine covering the digestive system; Azhari et al. (2023) designed an Islamic-integrated magazine on the excretory system; and Pratiwi et al. (2017) developed a biology magazine as a learning medium for the topic of protists. However, no previous studies have specifically focused on the development of a biology e-magazine based on the *Wahdatul Ulum* paradigm, particularly in electronic form. Therefore, this study aims to develop a *Wahdatul Ulum*-based e-magazine for the topic of the human digestive system. This E-Magazine is unique in that it combines scientific content with Islamic values in an interactive format. It includes interpretations of Qur’anic verses that are relevant to the topic of the digestive system, as well as interactive features and spiritual narratives that enhance both students’ understanding and character development.

This approach makes the learning media not only cognitively effective but also capable of fostering religious awareness in a harmonious manner. The e-magazine is expected to facilitate students in learning and understanding the subject matter, particularly in comprehending the digestive system. This topic is highly suitable for e-magazine format, as it allows the presentation of high-quality images and other visual elements such as videos, which enhance the accessibility and richness of information delivered in the learning content.

The development of a Wahdatul Ulum-based e-magazine is essential as a learning resource aimed at increasing students' interest and engagement in learning. By integrating scientific literacy with religious values, this e-magazine is expected to enhance students' comprehension of subject matter while simultaneously fostering their spiritual awareness. This integrative approach encourages students to view science from a broader and deeper perspective, enriching both their intellectual and moral development (Hasibuan & Khairani, 2025).

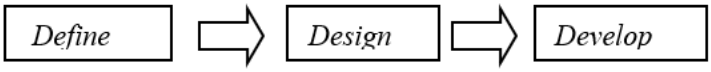
Based on the issues and facts previously described, there is a clear need for an e-magazine or instructional material related to the digestive system that integrates the Wahdatul Ulum paradigm to enhance students' learning outcomes. The development of this e-magazine is also expected to support teachers by facilitating the teaching and learning process of the digestive system material in a more structured and integrative manner.

2. RESEARCH METHOD

The method used in this study is Research and Development (R&D), which is a process of developing new products or improving existing ones to ensure they are accountable and reliable (Riani Johan et al., 2023). This research was conducted from February to May 2025 at SMA Mamiyai Al-Ittihadiyah Medan. The population in this study consisted of all 11th-grade science students (XI MIPA) at SMA Mamiyai Al-Ittihadiyah, totaling 27 students. The sampling technique used was purposive sampling, which involves deliberately selecting subjects based on specific criteria relevant to the research objectives—namely, students in class XI MIPA who were studying the digestive system topic. The research design employed the 4D development model, which consists of four stages: Define, Design, Develop, and Disseminate. The 4D model was chosen because it provides a systematic and comprehensive framework while maintaining a practical focus on the stages of product development. This model facilitates researchers in managing the development process of learning media through clear and structured steps, from planning to dissemination.

This model provides a detailed and systematic framework that facilitates the development of a product tested for its validity, effectiveness, and practicality. However, due to time constraints, this study was limited to the Develop stage and did not proceed to the Disseminate stage. The Disseminate stage is crucial as it aims to expand the reach of the product, test its acceptance in a broader context, and gather feedback from various user environments. Without this stage, the scope of the research remains limited, as the results cannot be fully generalized and the product's impact has not been tested on a larger scale.

Stages of 4D model development



The following is a description of the 4D development model stages as adapted from Arum (2020):

1. Define (Definition): This stage includes several key steps: (1) Front-End Analysis, which involves identifying the potentials and problems in product development by considering students' needs and available resources. In this study, the researcher conducted a needs analysis through interviews (2) Learner Analysis, conducted by distributing questionnaires to assess students' learning needs (3) Concept Analysis, carried out through interviews with biology teachers to determine difficult concepts and the relevant content to be included in the learning media (4) Task Analysis, aimed at identifying the learning tasks required to achieve the learning objectives (5)Specifying Instructional Objectives, which involves establishing clear and measurable learning goals.
2. Design (Planning): This stage involves several components: (1) Content Preparation: The learning content was reviewed and adapted to align with the context of the instructional material, based on the Grade XI Biology textbook following the 2013 Curriculum (2) Media Selection: The choice of media was adjusted to address students' learning needs and the existing learning challenges (3) Format Selection: The Wahdatul Ulum-based e-magazine was designed using the Canva application, with a layout size of 21 × 29 cm, employing a combination of fonts selected from Canva to suit the overall visual design (4) Initial Design: The e-magazine was equipped with relevant images and assignments that were aligned with the digestive system topic.
3. Develop (Development): This stage includes two main activities: expert appraisal and development testing. In the expert appraisal phase, the researcher conducted a validation process involving media experts, subject matter experts, and Wahdatul Ulum experts to evaluate the feasibility of the product design. Meanwhile, development testing was carried out on a small-scale group of participants to collect responses from both students and teachers. The feedback obtained during this trial phase was used to revise and improve the product before conducting further testing to ensure its effectiveness on a broader scale.

The trial subjects in this study were 11th-grade science students (XI MIPA) at SMA Mamiyai Al-Ittihadiyah. The technique used in selecting the subjects for this study is purposive sampling, in which the

researcher deliberately selects subjects who are considered most relevant and capable of providing the necessary information in accordance with the objectives of the study. A total of 12 students participated in the practicality test, while 27 students were involved in the effectiveness test. The sample characteristics included students who had previously acquired foundational knowledge about the structure and function of human organs. This selection aimed to ensure that the participants could provide relevant assessments and feedback on the developed product, both in terms of ease of use (practicality) and learning outcomes (effectiveness). The instruments used in this study were interview sheets and student needs analysis questionnaires. Validation sheets were also employed, consisting of separate instruments for material experts, media experts, and Wahdatul Ulum experts, to assess the validity of the developed product. In addition, response questionnaires were distributed to both teachers and students to evaluate the practicality of the Wahdatul Ulum-based E-Magazine as a learning medium. Finally, pre-tests and post-tests were administered, each consisting of 20 multiple-choice questions with five answer options, to measure the effectiveness of the e-magazine in enhancing students' learning outcomes.

Data Analysis Techniques

Qualitative analysis was used to process data obtained from interviews and expert input (subject matter and media experts) related to the developed product. Meanwhile, quantitative analysis was applied to process data derived from validation questionnaires assessing the feasibility of the product, as completed by media experts, content experts, and Wahdatul Ulum experts, as well as response questionnaires from teachers and students. The validation results and feedback from both teachers and students were analyzed using score categories based on the Likert scale, as suggested by Sugiyono (2019).

Table 1. Likert Scale Scoring Criteria

Score	Description
5	Very Good (VG)
4	Good (G)
3	Fair (F)
2	Poor (P)
1	Very Poor (VP)

(Sugiyono, 2019)

Validity Test Analysis

The results obtained from the validation by subject matter experts and media experts, as well as the feedback from teachers and students, were analyzed to determine the level of product feasibility. The feasibility level was calculated using the following percentage formula:

$$Percentage\% = \frac{Scores\ Total}{Highest\ Scores} X\ 100\%$$

The feasibility criteria used in the development of this E-Magazine are based on achievement levels expressed in percentage form, as outlined below:

Table 2. CriteriaValidation

Percentage	Criteria
81% - 100%	Very Feasible
61% - 80%	Feasible
41% - 60%	Less Feasible
21% - 40%	Not Feasible
0% - 20%	Very Not Feasible

(Ernawati & Sukardiyono, 2017)

Practicality Test Analysis

To evaluate the practicality of the E-Magazine media and content, response questionnaires were distributed to teachers and students. The results of these questionnaires were analyzed using the following formula:

$$Praktis = \frac{Observed\ Score}{Expected\ Score\ Practical} X\ 100\%$$

Table 3. Practicality Assessment Criteria

Percentage	Criteria
81% - 100%	Very Practical
61% - 80%	Practical
41% - 60%	Quite Practical
21% - 40%	Not Practical
0% - 20%	Very Not Practical

(Mahadiraja & Syamsuarnis, 2020)

Effectiveness Test Analysis

The effectiveness of the learning media was assessed by evaluating students' learning outcomes through pre-tests and post-tests. The improvement in student performance before and after the use of the Tikok-based biology learning media was measured using the normalized gain (N-Gain) formula as follows:

$$Standart\ Gain = \frac{score\ posttest - score\ pretest}{score\ maximum - score\ pretest}$$

The criteria for the normalized Gain Score refer to Hake (2002) and are presented in the following table:

Table 4. N-Gain Value Criteria

N-Gain rate-rate	Classification	Information
N-Gain ≥ 0,7	High	Effective
0,3 ≤ N-Gain < 0,7	Currently	Quite Effective
N-Gain < 0,3	Low	Less Effective

3. RESULT AND DISCUSSION

Based on the research conducted, a learning media in the form of an E-Magazine based on *Wahdatul Ulum* was developed for the digestive system topic for Grade XI students. This E-Magazine was developed using the 4D (Define, Design, Develop, and Disseminate) model. However, this study was limited to the development stage only. The following section outlines the development phase of the E-Magazine as implemented in this study.

1. Define

In the definition stage of the 4D development model, five types of analyses were conducted to determine the appropriate direction for media development. The front-end analysis revealed that Biology learning at SMA Mamiyai Al-Ittihadiyah still faces several challenges, including low student interest in reading textbooks, limited use of engaging instructional media, and the lack of visually appealing learning resources provided by teachers. Moreover, the learning process had yet to integrate Biology content with Islamic values. In response to these issues, the researcher developed a learning media in the form of a *Wahdatul Ulum*-based E-Magazine. Learner analysis was carried out through questionnaires and interviews, which indicated that students preferred diverse learning media that include visual elements such as images and are easy to understand.

The concept analysis stage was conducted through observations and interviews with Biology teachers, which revealed that the digestive system topic, although considered relatively simple, is still often difficult for students to understand. Furthermore, the material has not yet been integrated with the *Wahdatul Ulum* concept. Teachers also tend to rely on conventional teaching methods such as lectures and primarily use textbooks as the main learning resource. Meanwhile, the results of the task analysis indicated that student learning activities were limited to taking notes and listening to the teacher's explanations, without being given challenging tasks that could encourage active participation in the learning process.

In the specifying instructional objectives stage, the learning outcome indicators were determined based on the Regulation of the Minister of Education and Culture (Permendikbud) No. 37 of 2018 and the 2013 Curriculum. Referring to Basic Competencies (Kompetensi Dasar/KD) 3.5 and 4.5, the instructional objectives for the human digestive system topic include the following aspects: (1) Students are expected to identify the structure and function of human digestive organs by linking them to relevant verses from the Qur'an and Hadith through literacy and discussion activities (2) Students are able to relate the nutritional content required by the human body to verses from the Qur'an and Hadith accurately through reading and discussion (3) Students can explain the human digestive process correctly through literature review and discussion (4) Students are able to analyze the impact of nutrient deficiency or excess on the body accurately through reading and discussion activities (5) Students are capable of examining various disorders of the digestive system and relating them to the values contained in the Qur'an and Hadith through literacy-based and discussion-based approaches and (6) Students can compile a written report on how to maintain bodily health based on the principles of nutrition and energy fulfillment through the digestive system in accordance with Islamic teachings.

2. Design

In the instructional media design stage, an e-magazine was selected as the primary medium for delivering the learning content. The choice of e-magazine was based on its advantages in presenting content in a visually appealing, engaging, and interactive manner, which is expected to enhance students' reading interest and understanding, particularly on the topic of the human digestive system. The media was designed using Canva, which was utilized for graphic design and page layout arrangement. The final design was exported in an interactive PDF format and published via Flipbook, allowing digital access with a page-flipping experience similar to a printed book.

The e-magazine was designed with a size of 21 x 29 cm, landscape orientation, and customized layouts and frames to provide sufficient space for presenting illustrations of digestive organs, infographics on nutrients, and relevant quotations from the Qur'an and Hadith. The initial content design of the e-magazine includes learning materials on the digestive system, covering: an overview of the digestive system, the structure and function of digestive organs, the mechanical and chemical processes of digestion, types of nutrients and essential foods for the human body, various digestive system disorders, as well as technologies and efforts to maintain the health of digestive organs.

3. Develop

In the development stage of the Wahdatul Ulum-based E-Magazine on the topic of the digestive system, validation testing, practicality testing, and effectiveness testing were conducted to ensure its validity, practicality, and effectiveness.

Table 6. Validation Result Values

Aspect	Indicator	Number of statements	Score Erned	Score Maximum	Persentase	Criteria
Media	E-Magazine size	2	10	10	100%	
	Cover Design	5	23	25	92%	
	E-Magazine Content Design	7	34	35	97%	
			Average		**96%**	**Highly Feasible**
Content	Content Feasibility	6	28	30	93%	
	Content Accuracy	4	17	20	85%	
	Language Usage	3	14	15	93%	
	Integration of Qur'anic Verses	2	9	10	90%	
			Average		**90%**	**Highly Feasible**
Wahdatul Ulum	Relevance of Al-Qur'an	4	17	20	85%	
	Integration of Islamic Values into Content	3	13	15	87%	
	Contextual Essence	2	9	10	90%	
			Average		**87%**	**Highly Feasible**

The validation results of the E-Magazine learning media (Table 6) indicated a very high level of feasibility, with a score of 96%. This suggests that the media is considered highly suitable for use in the learning process. These findings are consistent with the study by Sari et al. (2024), which states that learning media validated with

a score of ≥90% fall into the "highly feasible" category and are ready to be implemented in teaching and learning activities. Nevertheless, the validation team provided several suggestions for improvement to enhance the quality of the learning media. Recommendations included improving the cover design to make it more visually appealing and more representative of the content, as well as adding a table of contents to facilitate user navigation. Additionally, it was suggested that the integration of Wahdatul Ulum values be presented at the beginning as a philosophical foundation that blends scientific knowledge with Islamic values.

According to (Nieveen, 1999), the validity of learning media is assessed based on content appropriateness, presentation quality, graphic design, and the overall integration of media elements. In this context, the validity of the E-Magazine media can be examined through three main dimensions, namely: Media quality, where validators assessed that the size, design, and layout of the E-Magazine complied with sound instructional design principles. This is in line with the view of (Smaldino, 2015), who emphasized that effective media should possess consistent visual appeal, harmonious color selection, and a balance between text and images. However, it was suggested that the cover design be improved to be more visually attractive and better represent the content. This indicates the importance of visual elements as the first impression in digital learning.

In addition, the content aspect was assessed as being highly relevant and aligned with the core competencies of 11th-grade Biology regarding the digestive system. However, to improve the readability and clarity of the material, validators recommended adding captions to each image and including a glossary at the end of the E-Magazine. This aligns with the theory of (Mayer, 2009) on Multimedia Learning, which states that verbal explanations accompanying visual elements can enhance student understanding through the integration of text and images. And the Wahdatul Ulum aspect one of the important aspects validated—was the integration of Wahdatul Ulum values, which combine scientific knowledge with Islamic values. Validators suggested that these values be placed at the beginning of the E-Magazine as a philosophical foundation. This reinforces a holistic educational approach that not only focuses on the cognitive aspect but also spiritual and affective dimensions, as emphasized by (Al-Attas, 1991) in the framework of the Islamization of knowledge.

The validators also suggested adding captions to each image to help students better understand the illustrations. In addition, they recommended increasing the number of pages to make the content more complete and comprehensive, and including a glossary at the end of the media to help students understand important terms related to the topic. By incorporating these revisions, the E-Magazine is expected to become a more informative, engaging, and integrative learning resource that aligns with the integrative education approach of the 2013 Curriculum.

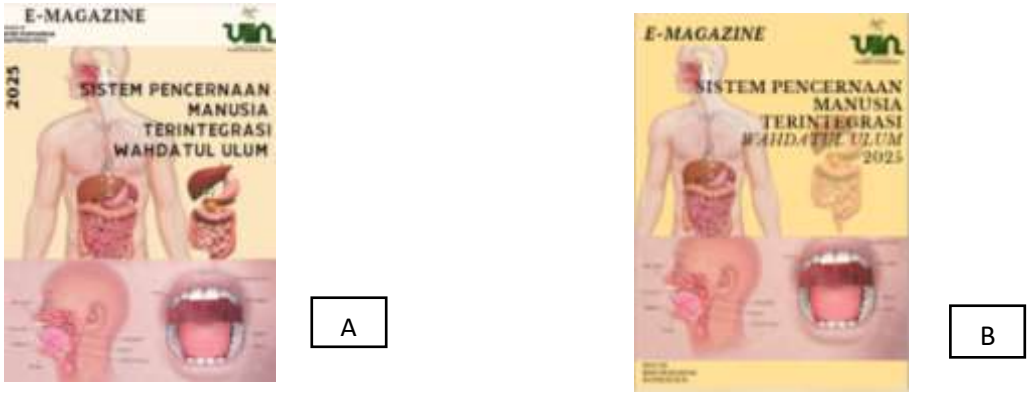


Figure 1. Front cover before (A) and after (B) revision based on media expert suggestions.

Figure 2. Suggestions from media experts, namely the addition of a table of contents in the E-Magazine.

The results of material validation in the E-Magazine learning media (as shown in Table 6) indicate that the media received a score of 90%, which falls into the "highly valid" category. This achievement suggests that, in general, the presented material is appropriate, systematically organized, and easy for students to understand. The core content on the human digestive system has been effectively delivered through a combination of text, illustrations,and the reinforcement of integrative values based on the concept of *Wahdatul Ulum*. Nevertheless, the validation team provided several suggestions for improving the content quality. First, they recommended adding examples of non-essential material as enrichment content. Second, the validators suggested incorporating an instructional video that explains the mechanism of the digestive system. The addition of audiovisual media is considered important to help students better visualize complex biological processes in a more concrete manner. This aligns with the findings of Dahliana (2021), which state that the use of audiovisual-based learning media for digestive system content has proven effective in increasing student interest in learning, and also received a validation rating in the "highly feasible" category. Third, it was advised that the researcher add a discussion on technological advancements in treating digestive disorders, such as the use of endoscopy. This material is important to broaden students' insights into scientific developments in the medical field and to strengthen the connection between learning content and the progress of modern science.

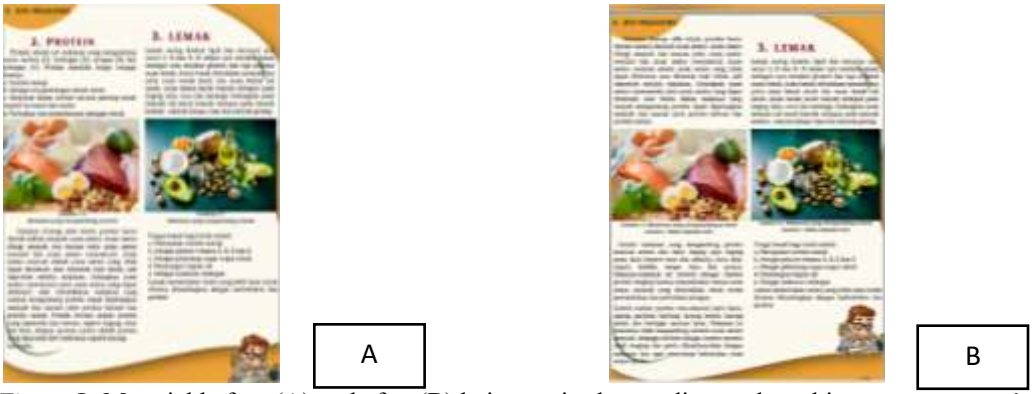


Figure 3. Material before (A) and after (B) being revised according to the subject matter expert's suggestions.

The validation results for the *Wahdatul Ulum* aspect in the E-Magazine learning media revealed a score of 87%, which falls under the "highly valid" category. This indicates that the media has successfully integrated Islamic values into the scientific content, particularly in the topic of the human digestive system. The integration is evident through the inclusion of relevant Qur'anic verses and Hadiths, which not only enhance the understanding of scientific concepts but also contribute to the instillation of spiritual values in students. However, the validation team provided an important suggestion—namely, the need to include interpretations (*tafsir*) or explanations of the inserted verses. The purpose of this addition is to ensure that students do not merely comprehend the verses in a literal sense, but are also able to grasp their contextual meanings and the correlation between the scriptural content and the scientific concepts being studied. The inclusion of *tafsir* is expected to enrich the integrative learning process, in line with the essence of *Wahdatul Ulum*, which emphasizes the synergy between religious knowledge and scientific inquiry.

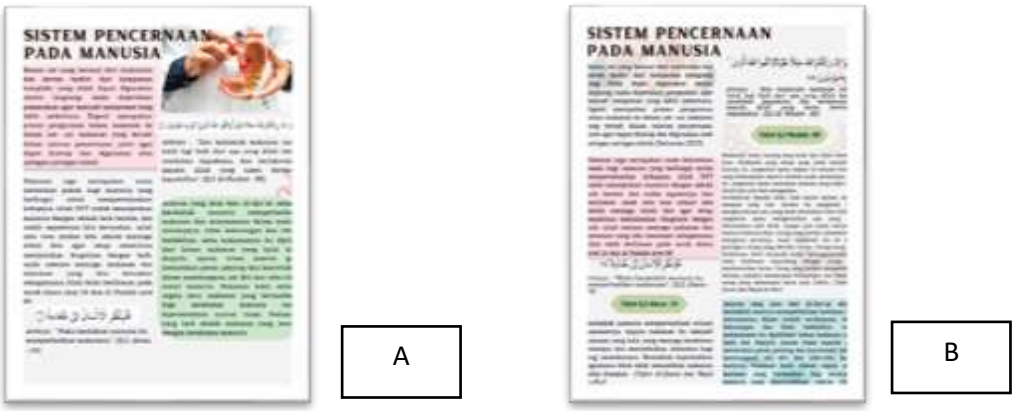


Figure 5. Addition of verse interpretation before (A) and after (B) revision based on suggestions from the *Wahdatul Ulum* expert.

Table 7. Practicality Test Results by Teachers and Students

Respondent	Item Statements	Score
Student	9	42,5
Teacher	10	48
Total Score		**90,5**
Percentage		**95%**
Criteria		**Very Practical**

Based on the practicality test results, the E-Magazine learning media received high scores from both teachers (96%) and students (94%), indicating that the media is highly practical and easy to use. Teachers found the E-Magazine effective in supporting the delivery of material in an engaging, systematic manner, aligned with the 2013 Curriculum and the *Wahdatul Ulum* approach. Students reported that the media was accessible, engaging, and encouraged learning motivation through its interactive visual design and integration of Islamic values. Overall, the media is considered suitable for use, as it supports conceptual understanding, enhances the teacher's role, and promotes active student engagement in 21st-century learning.

Table 8. Effectiveness Test Results Based on N-Gain

Score	Avarage Score	Maximum Score	N-Gain Score	Criteria
Pretest	36.20	100	**0.77**	Efektif
Posttest	82.23	100		

A well-designed visual aspect, systematic organization of the material, and the integration of Islamic values through the *Wahdatul Ulum* approach have clearly contributed positively to enhancing students' interest and understanding. The effectiveness of this media can be explained through cognitive theory and principles of instructional design. According to Mayer (2009) in the Multimedia Learning theory, learning becomes more effective when information is presented in a multimodal format—for example, through complementary text and visuals—because it reduces cognitive load and facilitates the processing of information in working memory.

In addition, the structured presentation of material supports the principle of sequencing in instructional design as proposed by Carey (2015), which involves organizing content progressively from simple to complex, thereby helping students build conceptual understanding step by step. The visualization of the digestive system's anatomy, accompanied by contextual explanations, reinforces the connection between students' visual and cognitive representations.

The integration of Islamic values through the *Wahdatul Ulum* approach also adds an affective and spiritual dimension to the learning process. This aligns with the concept of integrative education according to Al-Attas (1991), who emphasized the importance of unifying modern scientific knowledge with Islamic values into a holistic framework. The inculcation of these values not only enriches the content but also contributes to the development of students' character and spiritual awareness. Overall, these findings affirm that the E-Magazine learning media not only meets practical and technical feasibility aspects but is also pedagogically and philosophically effective. Therefore, this media is highly recommended as an innovative digital learning alternative that harmoniously integrates scientific knowledge with Islamic values.

4. CONCLUSION

This study developed a *Wahdatul Ulum*-based E-Magazine on the human digestive system for Grade XI using the 4D model (Define, Design, Develop, Disseminate), limited to the *Develop* stage. Validation results showed high feasibility, with scores of 96% (media), 90% (content), and 87% (*Wahdatul Ulum* integration). Practicality tests by teachers and students reached 96% and 94%, indicating the media is very practical and user-friendly. Effectiveness testing showed a high N-Gain score of 0.77, reflecting significant improvement in students' understanding. The integration of Qur'anic verses and Hadith enriches the scientific content and strengthens students' spiritual values. Thus, the E-Magazine is valid, practical, and effective as an innovative digital learning tool that harmonizes science and Islamic values.

5. ACKNOWLEDGEMENT

The author would like to express sincere gratitude to Mrs. Rasyidah, M.Pd., as the academic advisor; Mrs. Syarifah Widya Ulfa, M.Pd., as the examiner; Dr. Mhd. Rafi'i Ma'arif Tarigan, M.Pd., as the media validator; Mrs. Mira Wahyuni, M.Pd., as the material validator; and Dr. Sapri, S.Ag., M.A., as the Wahdatul Ulum validator, for their valuable suggestions and constructive feedback regarding the feasibility of the media. The author also

extends heartfelt thanks to all teachers, students, and staff of SMA Mamiyai Al Ittihadiyah, as well as to fellow colleagues, for their continuous support and encouragement throughout the course of this research.

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