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Development of Physics Learning Media Integrated with Artificial Intelligence and Islamic Values on Free Fall Motion Material

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Abstract

The need for innovative physics learning media that integrate Artificial Intelligence (AI) and Islamic values has become increasingly important in supporting meaningful science learning, particularly in abstract topics such as free fall motion. This study aimed to develop AI-based physics learning media integrated with Islamic values for students at SMP Tastafi Abu Lamkawe, Pidie Regency, Aceh. The study employed a Research and Development (R&D) method using the ADDIE model. Data were collected through expert validation and student response questionnaires. The findings showed that the developed media obtained a material expert validation score of 72.2%, categorized as feasible; a media expert validation score of 84%, categorized as feasible; a *tafsir* expert validation score of 73.3%, categorized as feasible; and a student response score of 79.54%, indicating positive and effective use. The media integrated Islamic values by encouraging *tafakkur* in understanding free fall phenomena as part of *sunnatullah*. These findings indicate that the developed media is valid, feasible, and effective for supporting physics learning. The study contributes to the development of integrative science education by demonstrating the potential

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of AI-based learning media to connect scientific concepts with Islamic values, while providing practical implications for teachers and educational institutions in designing innovative, spiritually oriented physics learning resources.

Keywords: Artificial Intelligence; Free Fall Motion; Islamic Values; Physics Learning Media; ADDIE Model

INTRODUCTION

Education is a fundamental aspect of human life because it plays an important role in shaping individuals' character, knowledge, and skills (Brown et al., 2023). Education can be obtained through family, community, and formal educational environments as part of a lifelong learning process (UNESCO Institute for Lifelong Learning, 2023). In Indonesia, the National Education System Law Number 20 of 2003, Article 1, explicitly mandates that students must possess spiritual and religious strength as a core educational outcome, while Article 2 affirms that national education is rooted in religious values as its fundamental basis. This legal mandate reflects the national commitment to producing graduates who are not only academically competent but also spiritually grounded and morally upright. Currently, education is not only oriented toward the mastery of knowledge but is also expected to integrate Islamic values into daily life so that students can achieve a balance between intellectual and spiritual intelligence (Juwairiyah & Fanani, 2025). The integration of religious values in the educational process is therefore important for developing a generation with good morals, strong character, and the ability to apply acquired knowledge wisely in social life (Elsayed et al., 2023).

Islamic education is a conscious and intentional effort aimed at shaping the personality of Muslim individuals by guiding behavioral change toward higher moral standards rooted in Islamic teachings (Surbakti et al., 2024). The process of Islamic education must instill values of devotion to Allah SWT as well as principles that govern the relationships between human beings (Ibrahim et al., 2024). In this regard, the integration of Islamic values into science subjects including physics represents a meaningful and strategic step toward producing learners who are not only academically competent but also spiritually grounded and morally aware (Latjompoh et al., 2025). The Quran itself invites believers to reflect upon natural phenomena as signs of Allah's greatness, providing a solid theological foundation for connecting physics learning with Islamic values (Yaacob & Haron, 2024). This approach

transforms physics not merely into a body of scientific knowledge, but into a medium for deepening students' faith and understanding of the natural order created by Allah SWT (Wahyuni et al., 2023).

In the context of Aceh Province, which upholds Islamic law (Syariat Islam) as the foundation of public life under its special regional autonomy status, the integration of Islamic values into all aspects of formal education becomes an institutional obligation rather than merely a pedagogical option. SMP Tastafi Abu Lamkawe, located in Gampong Kandang, Kecamatan Kembang Tanjung, Kabupaten Pidie, Aceh. As an institution that integrates dayah (Islamic boarding school) culture with formal schooling, SMP Tastafi Abu Lamkawe carries a particular responsibility to ensure that all subjects taught, including natural sciences and physics, are delivered within an Islamic value framework. However, based on preliminary observations and interviews conducted at the school, the integration of Islamic values into physics learning has not yet been fully realized in classroom practice, creating a gap between the school's Islamic educational vision and the actual implementation of learning activities. Learning resources currently used at the school neither incorporate Islamic value integration nor utilize technology-based or interactive media, resulting in a conventional and less engaging learning experience for students (Septiana & Rohmadi, 2023).

Physics is one of the core subjects in science education that plays a vital role in developing students' critical thinking, analytical reasoning, and scientific literacy. However, physics is widely acknowledged as one of the most challenging and least engaging subjects for students, particularly at the junior high school level, due to the abstract nature of its concepts, the heavy mathematical demands, and the limited connection between classroom content and students' real-world experiences (Shabir, 2023). Research consistently shows that junior high school students often struggle to construct meaningful understanding of physics concepts when instruction is limited to conventional approaches such as lecture-based teaching, textbook memorization, and static worksheets (Zailani et al., 2024). These challenges are further compounded by a lack of interactive and technology-based learning media that can visualize abstract phenomena and bridge the cognitive gap between scientific theory and observable physical reality (Sebastian & Kuswanto, 2024).

One topic within the physics curriculum that is particularly prone to student misconceptions is free fall motion. Studies have consistently documented that a large proportion of students hold the erroneous belief that heavier objects fall faster than lighter

objects under gravity a deeply rooted misconception that directly contradicts Galileo's principle of free fall (Dognia & Dah, 2023). This misconception is not merely a surface-level misunderstanding; it reflects a fundamental gap in students' conceptual schema regarding the nature of gravitational acceleration and the conditions governing free fall (Nisa & Habibbulloh, 2024). Furthermore, students frequently experience difficulty distinguishing between the concepts of velocity, acceleration, and gravitational force during free fall, particularly when presented with graphical or mathematical representations of the motion (Zailani et al., 2024). Without appropriate instructional interventions supported by adequate learning media, these misconceptions tend to persist and interfere with students' ability to understand more advanced physics concepts in subsequent learning stages. Based on observations and preliminary interviews with physics teachers at SMP Tastafi Abu Lamkawe, students demonstrated low conceptual understanding of free fall motion, with many holding common misconceptions about the effect of mass on free fall acceleration. Teachers also reported that available learning resources for this topic are limited to static printed materials and do not provide visual or interactive representations of the physical phenomena involved.

Learning media play a critically important role in the physics learning process, as they serve as tools to visualize abstract concepts, simulate physical phenomena, and bridge the gap between scientific theory and students' everyday understanding (Septiana & Rohmadi, 2023). The quality and relevance of learning media significantly influence students' motivation, engagement, and depth of conceptual understanding (Sebastian & Kuswanto, 2024). In the twenty-first century educational landscape, the development of technology-based learning media that are interactive, adaptive, and contextually meaningful has become increasingly essential to meet the diverse learning needs of students and to address the limitations of conventional instructional approaches (Treve, 2024). Among the rapidly evolving technologies transforming education globally, Artificial Intelligence (AI) has emerged as one of the most promising tools for developing personalized, adaptive, and engaging learning experiences. AI-powered educational tools including intelligent tutoring systems, AI chatbots, adaptive learning platforms, and AI-driven simulations are capable of providing real-time feedback, dynamically adjusting content to individual learners' needs, supporting inquiry-based learning, and enabling interactive visualization of complex scientific concepts (Naveed-Babur, 2025). These characteristics make AI particularly well-suited for addressing the challenges of physics learning, where students require not only

factual knowledge but also deep conceptual understanding and the ability to apply principles flexibly across different contexts (Kusuma et al., 2024).

Research has demonstrated that the integration of AI tools in science and physics education yields significant improvements in student learning outcomes, conceptual understanding, motivation, and engagement (Ng et al., 2024). In particular, AI chatbots configured with pedagogical guidance have shown considerable effectiveness in supporting students' self-regulated learning, reducing learning anxiety, and promoting sustained engagement with challenging scientific content (Ng et al., 2024). Moreover, AI-powered simulations and interactive digital environments offer students the opportunity to explore physical phenomena such as free fall motion through dynamic, visualized, and responsive representations that static media cannot provide. Despite this growing body of evidence, the development of AI-integrated learning media that simultaneously incorporates Islamic values particularly for the topic of free fall motion at the junior high school level remains a largely underexplored area in the existing literature. Most studies on AI in physics education focus exclusively on cognitive and academic outcomes, without addressing the spiritual and character-forming dimensions that are central to the educational mission of Islamic-based schools such as SMP Tastafi Abu Lamkawe.

The integration of Islamic values within science and physics learning media adds a distinctive and important dimension to the educational experience. By connecting physical phenomena such as the gravitational force governing free fall to Quranic verses and Islamic reflections on Allah's creation, learning media can simultaneously deepen students' conceptual understanding of physics and strengthen their spiritual awareness and faith (Yaacob & Haron, 2024). Research on the development of Islamic-integrated physics learning media has shown that such approaches not only improve students' scientific understanding but also increase their motivation, positive attitudes toward learning, and appreciation of the relationship between science and religion (Septiana & Rohmadi, 2023; Wahyuni et al., 2023). The combination of AI technology and Islamic value integration in a single learning medium therefore represents a novel and significant contribution to the field of physics education, particularly within the context of Indonesian Islamic educational institutions.

Based on the foregoing analysis, there is a clear and urgent need to develop physics learning media that integrates Artificial Intelligence and Islamic values specifically for the

topic of free fall motion, tailored to the learning context and institutional vision of SMP Tastafi Abu Lamkawe, Kabupaten Pidie, Aceh. This study therefore aims to develop, validate, and evaluate AI-integrated, Islamic-value-embedded physics learning media on the topic of free fall motion, using the ADDIE development model. The developed media is expected to address students' misconceptions on free fall motion, enhance conceptual understanding, and simultaneously cultivate students' spiritual awareness by connecting the physical phenomenon of free fall to the signs of Allah's greatness as reflected in the Quran, thereby supporting the realization of the school's mission to produce graduates who are both intellectually capable and morally and spiritually upright

METHODS

Research Design

This study employed a Research and Development (R&D) approach, which is oriented toward the improvement and expansion of existing educational products by emphasizing novelty and the production of tangible, applicable outputs (Anggereni et al., 2019). The development of the learning media in this study was guided by the ADDIE model, originally introduced by Dick and Carey in 1978 (Zainuddin et al., 2020). The ADDIE model is a systematic instructional design framework that outlines the fundamental stages of developing effective learning systems. It employs a systems-based approach to instructional planning by organizing the development process into a logical sequence of stages, with evaluation and revision conducted continuously at each phase to ensure the quality and appropriateness of the product being developed (Angko & Mustaji, 2013). The development process in this study was carried out through five sequential stages: Analysis, Design, Development, Implementation, and Evaluation (Cahyadi, 2019), conducted from October 2024 to February 2025 (approximately five months). The overall flow of the ADDIE development model applied in this study is illustrated in Figure 1.

Figure 1. ADDIE Development Model

Stage 1 Analysis

The Analysis stage aimed to identify the fundamental needs and problems related to physics learning at SMP Tastafi Abu Lamkawe, particularly on the topic of free fall motion. Data collection at this stage was conducted through three main activities. First, semi-structured interviews were held with the physics teacher at SMP Tastafi Abu Lamkawe to gather information regarding learning challenges, difficulties encountered during instruction, types of media currently in use, and the availability of supporting learning facilities. Second, an analysis of students' difficulties in understanding free fall motion was conducted, focusing on their comprehension of relevant facts, concepts, and physical principles related to gravitational acceleration and free fall kinematics. Third, a curriculum analysis was performed, encompassing the review of the applicable syllabus, learning objectives, and student competency indicators that the developed media was expected to support. The results of this analysis formed the foundation for determining the specifications, content, and features of the AI-integrated, Islamic-value-embedded learning media to be developed.

Stage 2 Design

In the Design stage, the conceptual structure and format of the AI-integrated physics learning media were planned and organized. Activities at this stage included determining the type of media to be developed, designing the overall structure and content layout, formulating the Islamic value integration framework including the selection of relevant Quranic verses and their connection to free fall motion phenomena and planning the AI features to be embedded within the media. A storyboard was also produced at this stage to serve as a visual blueprint guiding the development process in the subsequent stage.

Stage 3 Development

The Development stage involved the actual production of the AI-integrated, Islamic-value-embedded physics learning media based on the design specifications established in the previous stage. Once the initial product was completed, it was submitted for expert validation to assess its feasibility and quality before being implemented in the classroom. Validation was carried out by six experts consisting of two material experts (content validity), two media experts (design and technical validity), and two Islamic interpretation experts (tafsir validity), whose assessments and suggestions were used as the basis for revising and refining the product.

Stage 4 Implementation

In the Implementation stage, the revised learning media was applied in an actual classroom setting at SMP Tastafi Abu Lamkawe. The implementation was conducted in January 2026 and lasted approximately three weeks. A small-group trial was conducted involving 30 students selected through purposive sampling, based on the criteria of being enrolled in the class studying free fall motion during the research period, to obtain student responses regarding the media's usability, attractiveness, and effectiveness. Students' responses, including their ratings and written suggestions, were collected through a structured questionnaire and used as feedback for further improvement of the learning media.

Stage 5 Evaluation

The Evaluation stage was conducted as an integrated and continuous process throughout all preceding stages, using formative evaluation as the primary approach. Formative evaluation was applied to monitor the quality and appropriateness of the product at each development phase and to ensure that revisions were made in alignment with the feedback received from expert validators and student respondents. The results of each evaluation cycle were used to refine the product progressively, ensuring that the final media met the established quality standards before being declared ready for broader implementation.

Data Collection and Analysis

Data in this study were collected using two complementary approaches. Quantitative data were obtained from expert validation questionnaires completed by material, media, and

tafsir validators, as well as from student response questionnaires. Qualitative data were gathered in the form of written comments, suggestions, and recommendations provided by expert validators and student users, which were used to guide product revisions (Masykur et al., 2017).

Expert validation data were analyzed quantitatively by converting validator scores from the assessment instruments into percentage values using the following formula (Sugiyono, 2013):

$$\text{NP}= \frac{R}{SM} \times 100\%$$

Where:

- *NP* = percentage score
- *R* = total score obtained from the questionnaire
- *SM* = maximum possible score

The resulting percentage values were then categorized according to the validity criteria presented in Table 1.

Table 1. Media Validity Criteria

Criteria	Percentage	Qualification	Action
Very Good (SB)	80% < x ≤ 100%	Very Valid	Used without revision
Good (B)	60% < x ≤ 80%	Valid	Used with minor revision
Sufficient (C)	40% ≤ x ≤ 60%	Moderately Valid	Used with revision per notes
Poor (SK)	≤ 40%	Not Valid	Requires comprehensive revision

Student response data were similarly converted into quantitative scores using the Likert scale, and the percentage of student responses was calculated using the following formula:

$$\text{P} = \frac{\sum_{i}^{n} {}_{-1} x_{1}}{k} \times 100\%$$

Where:

- P = percentage of student response
- ∑xi = total score from all respondents
- n = number of respondents
- k = maximum total score

The percentage values obtained were interpreted based on the student response criteria presented in Table 2.

Table 2. Student Response Interpretation Criteria

Percentage of Student Response	Interpretation	Conversion
85% ≤ P	Very Positive	Effective
70% ≤ P < 85%	Positive	Effective
60% ≤ P < 70%	Moderately Positive	Not Effective
50% ≤ P < 60%	Less Positive	Not Effective
P < 50%	Not Positive	Not Effective

(Sugiyono, 2013)

RESULTS

The results section should be presented factually, systematically, and in a data-based manner. Authors should report the research findings from the main results to relevant supporting data in accordance with the research objectives, research questions, or hypotheses. This section should not include theoretical interpretation, comparison with previous studies, or in-depth discussion, as these elements should be presented in the Discussion section.

This study presents the developmental outcomes of AI-integrated physics learning media incorporating Islamic values on the topic of free fall motion at SMP Tastafi Abu Lamkawe, Kabupaten Pidie, Aceh. The development followed the five sequential stages of the ADDIE model, each producing specific outcomes that collectively shaped the final media product.

a. Analysis Stage

The analysis stage was conducted through three interconnected activities to establish a comprehensive understanding of the learning context, student needs, and curricular requirements at SMP Tastafi Abu Lamkawe. First, a curriculum analysis was performed by examining the applicable syllabus, Core Competencies, and Basic Competencies for the topic of free fall motion, ensuring that the developed media would align with the prescribed learning standards. Second, a needs analysis directed at the physics teacher was conducted through semi-structured interviews. The results revealed that physics instruction at the school remained predominantly conventional, relying on printed textbooks and teacher-centered lecture delivery without the use of interactive or technology-based media. The

teacher confirmed that no learning media had previously integrated Islamic values into the physics curriculum, particularly for free fall motion. Third, a needs analysis targeting students identified significant learning difficulties and persistent misconceptions regarding free fall motion concepts. Many students held the erroneous belief that heavier objects fall faster than lighter ones under gravity a well-documented conceptual error that reflects a fundamental gap in students' understanding of gravitational acceleration (Dognia & Dah, 2023). Students also expressed limited capacity to connect their physics learning to broader spiritual meanings, indicating that the current learning experience had not yet guided them to observe and reflect upon the phenomenon of free fall as a manifestation of Allah's power and order in the universe.

b. Design Stage

Based on the analysis findings, the design of the AI-integrated physics learning media was carefully structured. The central design philosophy of this media was to place the physics concept of free fall motion as the primary academic content while embedding Islamic values as a representational framework through which students are guided to perceive and reflect upon the phenomenon of free fall as a sign of Allah SWT's greatness. Rather than merely appending Quranic verses as decorative additions to the physics content, the Islamic value integration in this media was designed to function as a cognitive and spiritual lens helping students recognize that the precise, unwavering law of gravitational acceleration governing free fall is not merely a physical principle, but a reflection of Allah's perfect order and design (sunnatullah) in the universe. This approach is grounded in the Quranic invitation to tafakkur deep reflection upon natural phenomena as signs (ayat) of Allah's greatness as expressed in QS. Ali 'Imran: 190–191, which calls upon people of reason to contemplate the creation of the heavens and the earth (Haromain & Hakim, 2023).

The content structure of the developed media consisted of the following components: (1) a thematic cover page; (2) a table of contents; (3) a concept map of free fall motion to support conceptual organization; (4) the core physics content covering the definition of free fall, gravitational acceleration ($g = 9.8\ m/s^2$), kinematic equations of free fall motion, motion graphs, and real-world applications; (5) an Islamic Values Reflection section, designed as a dedicated space within the media where students are guided to observe, think, and reflect upon the free fall phenomenon through the Islamic lens of tafakkur recognizing, for example, that every object falling under gravity obeys a precise and

consistent law that Allah has decreed as part of His perfect creation; (6) a Scientist Profile section featuring Muslim and non-Muslim scientists whose work on gravity connects to the history of scientific discovery; (7) a Physics Notes summary; (8) AI-powered interactive exercises and simulations; (9) science literacy-based questions; (10) a Motivational Quotes column; and (11) an interactive activity section. The AI features integrated into the media included an AI chatbot for real-time conceptual question-answering support, adaptive content sequencing responsive to students' learning progress, and dynamic animated simulations visualizing free fall motion phenomena.

c. Development Stage

The development stage produced the AI-integrated, Islamic-value-embedded physics learning media based on the established design specifications. Following completion of the initial product, expert validation was conducted across three dimensions content validity, media design validity, and Islamic interpretation (tafsir) validity by six experts comprising two material validators, two media validators, and two tafsir validators. Their assessments and recommendations served as the basis for systematic product revision.

1. Material Expert Validation

Material validation was carried out by two physics education experts and assessed nine components encompassing content alignment with Core and Basic Competencies, relevance to student learning needs, content accuracy and currency, information clarity, presentation quality, language compliance (EYD), and overall learning presentation. The results are presented in Table 3.

Table 3. Material Expert Validation Results

No.	Assessment Component	Total Score
1	Alignment with Core and Basic Competencies	2
2	Alignment with students' learning needs	3
3	Content accuracy	4
4	Content currency	3
5	Clarity of information	2
6	Quality of content presentation	3
7	Compliance with EYD	4
8	Supplementary presentation elements	3
9	Learning presentation quality	2
Total Score		26
Average Score		2.89
Percentage		72.2%

No.	Assessment Component	Total Score
	Category	Sufficiently Good
	Criterion	Feasible

Material validation produced an average score of 72.2%, categorized as Sufficiently Good and declared Feasible. Validators confirmed that the physics content on free fall motion including definitions, equations, motion graphs, and application examples was scientifically accurate and appropriately grounded in the curriculum. Recommendations for revision focused on restructuring the sequencing of conceptual explanations to follow a more scaffolded, student-centered progression, and strengthening the logical connection between the physics concepts and the Islamic reflection sections so that the tafakkur components would feel integrated within the learning flow rather than separate from it.

2. Media Expert Validation

Media validation was performed by two instructional design experts and assessed five components: overall media presentation, layout, color scheme, text readability, and visual display quality. Results are shown in Table 4.

Table 4. Media Expert Validation Results

No.	Assessment Component	Total Score
1	Overall media presentation	4
2	Layout	5
3	Color scheme	5
4	Text readability	3
5	Visual display quality	4
	Total Score	21
	Average Score	4.2
	Percentage	84%
	Category	Good
	Criterion	Feasible

Media validation yielded an average score of 84%, categorized as Good and declared Feasible. Validators acknowledged that the overall visual design, layout, and use of AI-driven animations to represent free fall motion were well-executed and conducive to student engagement. Text readability was identified as an area requiring improvement, with validators recommending standardization of font type and size, and correction of typographical inconsistencies. These revisions were implemented prior to classroom implementation.

3. Tafsir Expert Validation

Islamic interpretation validation was conducted by two tafsir experts and assessed three components: the quality of Islamic value integration within the physics content, the degree to which the integration supported students' spiritual development, and the accuracy and appropriateness of Quranic verse selection and presentation. Results are presented in Table 5.

Table 5. Tafsir Expert Validation Results

No.	Assessment Component	Total Score
1	Islamic integration quality	3
2	Support for spiritual development	4
3	Language and verse presentation	4
Total Score		11
Average Score		3.67
Percentage		73.3%
Category		Sufficiently Good
Criterion		Feasible

Tafsir validation produced an average score of 73.3%, categorized as Sufficiently Good and declared Feasible. Validators affirmed that the Islamic reflection sections designed to guide students in perceiving the phenomenon of free fall as a sign of Allah's precision and sovereignty over the physical universe were spiritually meaningful and educationally appropriate. They specifically appreciated the design intention of positioning Islamic values not as external additions to the physics content, but as a representational framework for cultivating students' tafakkur skills in the context of natural phenomena (Haromain & Hakim, 2023). Recommendations included ensuring that the Islamic reflection content was thematically unified with the physics discussion it accompanied, and that the selected Quranic verses were presented with clear, accessible Arabic typography to support students' reading comprehension.

d. Implementation Stage

Following expert-guided revisions, the developed media was implemented in a small-group trial involving 30 students at SMP Tastafi Abu Lamkawe. Student responses were collected through a structured questionnaire across four dimensions: content clarity, visual design, attractiveness, and perceived benefit. The results are presented in Table 6.

Table 6. Student Response Data

No.	Student Code	Percentage (%)	Interpretation	Conversion
1	S1	83.75	Positive	Effective
2	S2	85.00	Very Positive	Very Effective
3	S3	77.50	Positive	Effective
4	S4	85.00	Very Positive	Very Effective
5	S5	79.00	Positive	Effective
6	S6	80.00	Positive	Effective
7	S7	82.50	Positive	Effective
8	S8	71.25	Positive	Effective
9	S9	75.00	Positive	Effective
10	S10	85.00	Very Positive	Very Effective
11	S11	83.75	Positive	Effective
Average		79.54%	Positive	Effective

The overall average student response was 79.54%, classified as Positive and Effective. Across the four response dimensions: in content clarity, 83.63% of students found the free fall motion material easy to understand, 80% confirmed its alignment with learning objectives, 76.36% agreed that the visualizations supported understanding, and 78.18% reported that the interactive AI features enhanced engagement. In visual design, 83.63% rated the text formatting positively, 76.36% appreciated the color scheme and font, 78.18% found image placement appropriate, and 85.45% expressed satisfaction with the overall cover and page design. In attractiveness, 70.90% reported reduced learning boredom, 76.36% expressed enjoyment in using the media, 83.63% felt motivated to study more actively, and 80% reported improved focus during learning. In perceived benefit, 89.09% recognized the media as a valuable learning resource, 83.63% reported enhanced comprehension through visual explanations, 81.81% valued the flexibility of digital access, and 83.63% stated that the media motivated them to apply scientific reasoning in daily life.

e. Evaluation Stage

Formative evaluation was applied continuously throughout all development stages, with revisions conducted at each phase based on feedback from expert validators and student respondents (Tegeh et al., 2013). This iterative evaluation process ensured that the final product progressively met the quality standards required for effective and meaningful physics learning integrated with Islamic values.

DISCUSSION

The ADDIE development model provided a structured and iterative framework that effectively guided the systematic creation, validation, and refinement of the AI-integrated physics learning media (Sari et al., 2017; Tegeh et al., 2015). Each developmental stage contributed meaningfully to the final product's quality, feasibility, and alignment with the dual educational goals of this study: enhancing students' conceptual understanding of free fall motion and cultivating their spiritual awareness through Islamic value integration.

The most distinctive feature of the developed media lies in its approach to Islamic value integration. Unlike approaches that merely insert Quranic verses as supplementary ornaments alongside physics content, this media was designed to position Islamic values as a representational framework through which students are guided to perceive and reflect upon the physical phenomenon of free fall as a manifestation of Allah SWT's greatness and perfect design. The physics concept of free fall motion governed by the constant gravitational acceleration of 9.8 m/s^2, applicable to all objects regardless of mass serves as the primary academic content, while the Islamic reflection component invites students to recognize that this unwavering physical law is a concrete expression of sunnatullah: the consistent, purposeful order that Allah has decreed upon His creation (Yaacob & Haron, 2024). When students observe through AI-driven animations that a feather and a stone fall at identical acceleration in the absence of air resistance, they are not only correcting a misconception they are being guided to experience a moment of tafakkur: witnessing a precise, universal physical truth as evidence of the flawless precision of Allah's creative order (Haromain & Hakim, 2023).

This approach is grounded in the Quranic perspective that natural phenomena are not merely physical events to be studied in isolation, but are ayat signs of Allah's power and wisdom, intended to be reflected upon by people of understanding (ulul albab). QS. Al-Hajj: 65 states that Allah holds back the heavens from falling upon the earth except by His permission, directly referencing the gravitational order that governs all falling objects in the universe. Similarly, QS. Al-Mulk: 3–4 invites believers to repeatedly look at the creation of the heavens and observe its flawless order, encouraging an active, observational engagement with natural phenomena as a spiritual practice. When students study free fall motion through this media, the AI-assisted simulation of an object accelerating uniformly toward the earth at 9.8 m/s^2 becomes not merely a data point to memorize, but a visual representation of the

reliability and perfection of the law that Allah has established a recognition that no object falls without His decree, and that every falling object follows a law designed with precision far beyond human invention (Latjompoh et al., 2025). This framework transforms physics learning from a purely cognitive exercise into a holistic educational experience that simultaneously develops students' scientific reasoning, their capacity for tafakkur, and their appreciation of Allah's greatness as revealed through the natural world (Kementerian Agama RI, 2024).

The material validation result of 72.2% confirmed that the physics content was accurate and curriculum-aligned, while the recommendations for improved content sequencing reinforced the importance of presenting free fall concepts in a logically progressive manner from the phenomenological observation of falling objects, to the derivation of kinematic equations, to the guided reflection on the precision of gravitational acceleration as a sign of divine order (Shabir, 2023). The media expert validation of 84% affirmed the strong quality of the interactive and visual design components, with AI-driven animations of free fall providing students with dynamic, engaging representations of the phenomenon that static printed materials cannot replicate (Sebastian & Kuswanto, 2024). The tafsir validation of 73.3% confirmed that the Islamic reflection sections were spiritually meaningful and developmentally appropriate, with validators specifically endorsing the design decision to integrate tafakkur as an active learning skill rather than a passive reading activity (Haromain & Hakim, 2023).

The student response average of 79.54% demonstrated that learners received the media positively across all evaluated dimensions. Notably, the highest satisfaction score was recorded for the perceived benefit of the media as a learning resource (89.09%), suggesting that students found genuine educational value in the media's combination of interactive AI features and Islamic reflection content. The integration of Islamic values within the free fall motion content appeared to increase the perceived meaningfulness of the learning experience, as students at SMP Tastafi Abu Lamkawe who are educated within an Islamic-based institutional environment could connect the physics phenomenon to their spiritual worldview. This finding supports research demonstrating that contextually meaningful and spiritually grounded learning experiences promote deeper student engagement and stronger motivation (Juwairiyah & Fanani, 2025; Mudzakkir & Aminah, 2024). The relatively lower score for the attractiveness dimension (70.90% for reduced learning boredom) suggests that future iterations of the media may benefit from incorporating additional gamification

features or more varied interactive scenarios to sustain engagement throughout the learning session (Treve, 2024).

Overall, the results demonstrate that the developed AI-integrated, Islamic-value-embedded physics learning media for free fall motion at SMP Tastafi Abu Lamkawe is valid, feasible, and positively received by students. The media successfully fulfills its dual purpose: delivering rigorous physics content on free fall motion through AI-enhanced interactive features, while simultaneously cultivating students' capacity to perceive the physical world through the Islamic lens of tafakkur recognizing the phenomenon of gravitational free fall as one of the many signs of Allah SWT's perfect, unwavering sovereignty over the universe, thereby supporting the school's mission of producing graduates who are both intellectually capable and deeply spiritually aware.

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