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The Use of H5P Lumi Education Interactive Multimedia in Improving Students' Cognitive Abilities in the Subject of Islamic Cultural History

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ABSTRACT

This study aimed to determine the improvement of students' cognitive abilities using HSP lumi education interactive multimedia in the subject of Islamic cultural history. This study was conducted at MTsS Mardiyah Islamiyah Panyabungan using the classroom action research (CAR) method consisting of two cycles, each carried out in two meetings. The subjects of this study were 29 students of class VIII at-Tin. Data collection techniques used observation sheets, multiple choice tests, and interviews. The results of the study showed that the cognitive abilities of students increased. In the pre-action, the number of students who completed was only 7 people, who had not completed 22 people, with an average value of 59.55, and a classical completion rate of 24%, increasing in cycle I to 12 students who had completed, 17 students who had not completed, with an average value of 72.58, and a classical completion rate of 41%. And in cycle II, the number of students who completed increased again to 26 people, who had not completed only 3 people, with an average value of 84.44, and classical completion percentage of 89%. Based on these results, it can be concluded that the use of H5P lumi education interactive multimedia can improve students' cognitive abilities in the subject of Islamic cultural history at MTsS Mardiyah Islamiyan with an increase of 65%.

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1. Introduction

The implementation of interactive multimedia in primary education (SD/MI) has become an imperative necessity that aligns with the cognitive development stages of children, who are predominantly in the concrete operational phase. At this level, students require visual and kinesthetic aids to internalize abstract concepts. By integrating text, images, audio, and animation, interactive multimedia simplifies complex subject matter by activating multiple sensory channels simultaneously. This

process significantly reduces the cognitive load, allowing information to be processed and stored in long-term memory more effectively compared to conventional lecture methods, which tend to be static and unidirectional. Interactive multimedia is a learning medium that integrates multiple elements such as text, images, sound, video, and animation (Kuchai et al., 2022). According to Mayer (in Kurniawan & Widiastuti, 2022), interactive multimedia helps students understand material better because it activates more than one sensory channel visual, auditory, and kinesthetics simultaneously. Thus, interactive multimedia-based learning allows students to gain more meaningful learning experiences through active engagement, unlike conventional learning, which tends to be one-directional and passive. Vaughan (in Abdy, 2023) also emphasizes that interactive multimedia enhances learning quality by creating two-way communication between learners and the learning system. Through interactive features, students are not merely recipients of information but can manipulate and control the learning process according to their needs. This interactivity fosters interest, motivation, and critical thinking skills.

In Islamic education, especially in the subject of Islamic Cultural History (Sejarah Kebudayaan Islam, SKI), the use of interactive multimedia is crucial to meet the challenges of the digital era. SKI integrates cognitive, affective, and psychomotor aspects in a balanced way. However, many SKI learning activities still rely on conventional teaching methods, where teachers dominate the process and students become passive listeners. This often results in a monotonous learning atmosphere that makes it difficult for students to understand historical connections and derive meaningful values from them. The same issue occurs at MTsS Mardiyah Islamiyah Panyabungan, where this study was conducted. Preliminary observations and interviews with the SKI teacher revealed that students' cognitive abilities were still low, with a pre-test average score of only 59.55 and a classical mastery rate of 24%. Students had difficulty recalling historical facts, explaining relationships among events, and analysing the roles of key Islamic figures. This was mainly due to the limited use of innovative media that match students' learning characteristics in the digital age.

One solution is the use of H5P Lumi Education interactive multimedia. H5P (HTML5 Package) is a digital learning platform that provides interactive learning activities such as videos, quizzes, games, and dynamic presentations. Lumi Education allows teachers to create and use H5P content offline, making it suitable for schools with limited internet access. This platform helps teachers deliver more engaging and meaningful learning experiences (Putri et al., 2024). The main advantage of H5P Lumi Education lies in its ability to create interactive and reflective learning experiences. Students not only watch videos or read materials but also participate in learning activities through quizzes and educational games that engage higher-order thinking skills (Indrawan et al., 2020). This approach stimulates cognitive development by integrating text, sound, and visuals, aligning with the constructivist learning theory, which states that knowledge is actively constructed by learners through interaction and exploration (Akhiruddin et al., 2020).

Furthermore, H5P Lumi Education supports active learning principles, in which students become subjects, not objects, of the learning process. They construct understanding through interactive activities such as digital quizzes and simulation-based tasks. Such activities enhance focus, motivation, and memory retention. Additionally, the use of H5P Lumi Education aligns with Indonesia's Ministry of Religious Affairs program promoting *Madrasah Digital*, aimed at strengthening

teachers' and students' digital literacy. Hence, this research not only contributes to academic discussion but also supports national policy in improving technology-based Islamic education quality. Based on these backgrounds, this study aimed to analyse the implementation of H5P Lumi Education and its impact on students' cognitive improvement, entitle *"The Use of H5P Lumi Education Interactive Multimedia in Improving Students' Cognitive Abilities in the Subject of Islamic Cultural History at MMI Panyabungan"*.

2. Literature Review

a. Interactive Multimedia in Learning

Multimedia in education refers to the integration of various media elements such as text, images, audio, video, and animation into a unified learning environment to convey instructional messages effectively. The term "multimedia" originates from the Latin words multus (many) and medius (means or medium), emphasizing the combination of multiple media forms to support learning (Yusa et al., 2024). In instructional contexts, multimedia represents an innovation that enables information to be delivered more comprehensively and engagingly compared to single-media approaches (Kuchai et al., 2022). Interactive multimedia goes beyond information presentation by allowing learners to actively engage with learning content through navigation, manipulation, and feedback mechanisms. Research indicates that the use of multimedia in classrooms can enhance learners' cognitive capacity by increasing motivation, improving focus, and facilitating deeper understanding (Buchori & Kholifah, 2022). In addition, multimedia-supported instruction has been shown to increase teaching efficiency and create a more engaging learning environment (Widya et al., 2022). These findings highlight the pedagogical value of multimedia, particularly when designed to be interactive and learner-centered.

b. Types of Multimedia Learning

Multimedia learning can be classified into linear multimedia and interactive multimedia. Linear multimedia presents content sequentially without user control, positioning learners as passive recipients of information. Common examples include instructional films, e-books, and slide presentations. Although effective for information delivery, this type of multimedia provides limited opportunities for learner interaction (Putra et al., 2024). In contrast, interactive multimedia is characterized by the presence of control tools that enable learners to actively engage with content. Learners can navigate materials, respond to questions, and interact with multimedia elements, fostering active learning. Interactive multimedia has been widely applied in various subjects, including Islamic Cultural History (Sejarah Kebudayaan Islam), where it supports learners' engagement and comprehension of historical concepts (Rohman, 2020). This interactivity is essential for promoting meaningful learning experiences.

c. Lumi Education as an Interactive Multimedia Platform

Lumi Education is a desktop-based application designed to support the development of interactive learning content through H5P technology. The platform enables educators to create multimedia learning materials without requiring programming skills, making it accessible to a broad range of teachers (Ginting & Tarigan, 2024). Lumi Education provides more than 40 types of interactive content, including interactive videos, quizzes, games, drag-and-drop activities, and course presentations (Putri et al., 2024). One of the key advantages of Lumi Education is its

flexibility and accessibility. The application can be used offline or online and allows users to export content in HTML5 format or share it via links. This feature supports content portability across different platforms and learning environments. Moreover, Lumi Education accommodates diverse learning styles visual, auditory, and kinesthetic thereby increasing learner engagement and participation (Syarifuddin & Utari, 2022). Previous studies suggest that the use of Lumi Education can enhance students' cognitive learning outcomes by promoting active interaction with learning materials (Darwish, 2021).

d. Cognitive Ability in Learning

Cognitive ability refers to learners' capacity to acquire, process, and apply knowledge. In educational theory, cognitive development is commonly explained using Bloom's Taxonomy, which categorizes learning objectives into cognitive, affective, and psychomotor domains (Kuswana, 2014). The cognitive domain focuses on mental processes such as remembering, understanding, applying, analyzing, evaluating, and creating. Cognitive learning involves internal mental activities related to thinking, comprehension, and problem-solving (Matara, 2023). Learners' cognitive achievement can be observed through their mastery of subject matter at conceptual and theoretical levels (Olvah et al., 2024). Effective instructional media, therefore, should support these cognitive processes by providing meaningful learning experiences. Interactive multimedia aligns with cognitive learning principles by encouraging learners to actively engage with content rather than passively receiving information.

e. Cognitive Development and Learning Media

The revised Bloom's Taxonomy proposed by Anderson and Krathwohl emphasizes the flexibility of cognitive levels based on learners' characteristics and instructional goals (Anderson & Krathwohl, 2023). For middle school learners, cognitive objectives typically focus on lower to intermediate levels, such as remembering, understanding, applying, and analyzing. Interactive multimedia is particularly effective for supporting these levels, as it provides structured activities and immediate feedback. Piaget's theory of cognitive development further supports the use of interactive learning media. Learners aged 12–15 are generally transitioning from the concrete operational stage to the formal operational stage, where abstract and analytical thinking begins to develop (Hanifah et al., 2023). Instructional media that combine concrete representations with interactive tasks can facilitate this transition. By enabling learners to explore concepts independently, interactive multimedia supports constructivist learning and enhances cognitive development (Akhiruddin et al., 2020).

f. Islamic Cultural History (SKI) Learning Context

Islamic Cultural History (SKI) is an essential subject in Islamic education that aims to develop learners' understanding of historical events, figures, and cultural achievements in Islamic civilization. The subject also seeks to instill moral values and historical awareness. However, the abstract and chronological nature of historical content often poses learning challenges for students (Zuhdi, 2021). Interactive multimedia offers an effective approach to addressing these challenges by visualizing historical narratives and presenting content in engaging formats. In particular, topics such as the Abbasid Dynasty which represents the golden age of Islamic civilization can be more effectively taught through interactive multimedia that illustrates historical contexts and intellectual contributions. Such approaches support both cognitive development and value-based learning in Islamic education contexts.

3. Method

This Classroom Action Research (CAR) was conducted at class VIII of MTsS Mardiyah Islamiyah Panyabungan, located on Willem Iskandar Street No. 51, Panyabungan, North Sumatra. The site was chosen due to the limited use of digital learning media. The participants were 29 students from class VIII At-Tin. The researcher acted as the planner, implementer, evaluator, and reflector, collaborating with the SKI teacher as an observer to strengthen analysis and reflection. The study was carried out in two cycles, each consisting of two meetings following the stages of planning, acting, observing, and reflecting (Jasiah, 2021). Data collection techniques included;

a. Observation sheets, used to record students' participation during lessons.
b. Documentation, such as photos taken during the learning process.
c. Written tests, to assess cognitive mastery.
d. Interviews, to capture students' responses toward the use of H5P Lumi Education.

The improvement in cognitive ability was measured using the percentage correction formula (Badruzaman et al., 2024).

$$\text{Expected Value} = \frac{Acquisition\ Score}{Maximum\ Score} \times 100\% \quad \text{(Purwanto, 2010).}$$

The average score was calculated following Purwanto (2010)

$$\text{Average Value} = \frac{total\ scores\ of\ all\ students}{total\ number\ of\ students} \quad \text{(Usman et al., 2019)}$$

The classical mastery percentage was calculated following Usman et al. (2019):

$$\text{Classical Completenesss} = \frac{\text{number of students who completed}}{\text{number of students}} \times 100\%$$

Students were considered competent if they achieved a minimum score of 75, and the class was deemed successful if 80% of students reached that level.

Learning Achievement Criteria (Purwanto, 2010)

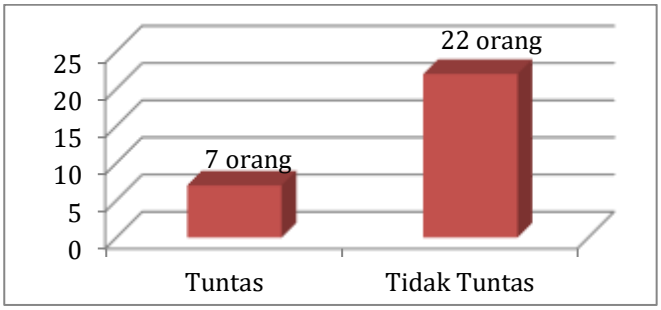
Achievement Level	Category
86 - 100%	Excellent
76 - 85%	Good
60 - 75%	Fair
55 - 59%	Poor
≤ 54%	Very Poor

4. Results and Discussion

This study was implemented using H5P Lumi Education in teaching the topic *"The History of the Abbasid Dynasty"*. The research was conducted through pre-action, Cycle I, and Cycle II.

Pre-Action Results:

The pre-test showed that students' cognitive abilities were still low. The total score was 1,727 with an average of 59.55. Only seven students met the mastery criterion (75), while twenty-two did not, resulting in a classical mastery of 24%.



Figures 1. percentage of Pre-Action Results

Cycle I Results

After introducing H5P Lumi Education, improvements were observed. The total score reached 2,105 with an average of 72.58. Twelve students achieved mastery, seventeen did not, and classical mastery increased to 41%. Although progress was seen, it was not yet satisfactory, so Cycle II was conducted.

Figure 2. Percentage of Cycle I Results

Cycle II Results:

In the second cycle, the total score increased to 2,449, with an average of 84.44. Twenty-six students met the mastery level, while only three did not, resulting in 89% classical mastery.

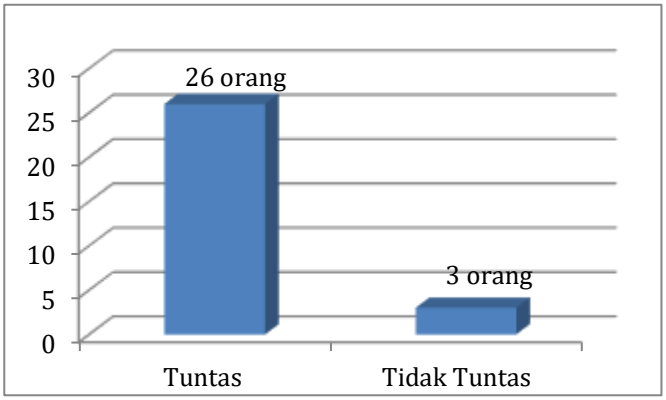


Figure 3. Percentage of Cycle II Results

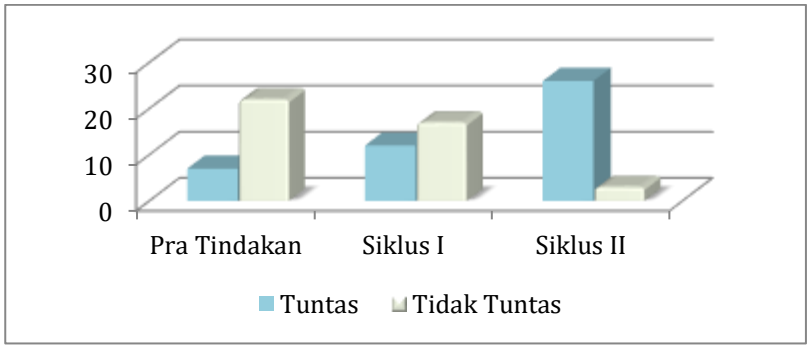


Figure 4. Recapitulation of students' completion percentage

Figures 1–4 illustrate these results, showing steady improvements across all stages. Overall, students' cognitive achievement increased by **65%** from pre-action to Cycle II. This improvement aligns with Piaget's (Hanifah et al., 2023) theory that learning is most effective when adjusted to students' cognitive development levels. Similarly, Bruner (Akhiruddin et al., 2020) states that cognitive growth can be enhanced through effective learning materials and suitable media. Bloom et al. (2023) also emphasize that cognitive ability reflects mental activity and mastery of content, which this study confirms through the use of interactive multimedia.

5. Conclusion

The findings of this study confirm that the use of H5P Lumi Education interactive multimedia effectively improves students' cognitive abilities in Islamic Cultural History. The average class score increased from 59.55 in the pre-action phase to 72.58 in Cycle I and 84.44 in Cycle II, representing a 65% overall improvement. This demonstrates that the integration of interactive multimedia enhances not only cognitive mastery but also motivation and engagement, making the learning process more dynamic, participatory, and meaningful.

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