LUMI INTERACTIVE EDUCATIONAL MEDIA BASED ON H5P FOR STUDENTS' CRITICAL THINKING SKILLS IN ELEMENTARY SCHOOLS

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Abstract. The ability to think critically is very important to be raised from an early age. The changing times as evidenced by the rapid development of technology can be utilized in education. H5P-based Lumi Education is one of the interactive media that can be used. However, a clear and in-depth study is needed to prove its effectiveness, before it will be applied thoroughly by educators. This study aims to examine the effectiveness of H5P-based Lumi Education interactive media in developing students' critical thinking skills in elementary schools through a literature study approach. The results of the review of various sources of scientific literature show that the use of H5P interactive media can increase students' motivation, engagement, and critical thinking skills. Interactive features such as quizzes, drag-and-drop, and interactive videos trigger deeper thinking activities. The Lumi Education platform also supports independent and reflective learning which is an important part of developing critical thinking skills. In addition, the conformity of this media with the principles of the Curriculum shows its relevance in the current educational context. Nevertheless, the effectiveness of this media is influenced by the readiness of teachers in designing content as well as the availability of supporting infrastructure. Thus, H5P-based Lumi Education has the potential as an innovative learning media to encourage learners' critical thinking skills from an early age.

Keywords: Lumi Education; H5P; Critical Thinking

I. INTRODUCTION

In today's global and digital era, critical thinking skills are essential competencies that must be mastered by every individual, including students at the Elementary School (SD) level. The ability to analyze information objectively, evaluate arguments, draw reasoned conclusions, and solve problems effectively is an important foundation for academic success, social life, and active participation in society (Sastradinata, B. L. N., 2023). Critical thinking skills equip students not only to receive information passively, but also to question, investigate, and build their own understanding of the world around them (Sholeh, M. I., et al., 2024).

However, the development of critical thinking skills at the elementary school level often faces various challenges. Traditional learning methods that tend to be teacher-centered and memorization do not provide adequate opportunities for students to develop their analytical and evaluative abilities (Hendriani, A., Rohayati, E., & Herlambang, Y. T., 2020). In addition, teachers' limited resources and time are also obstacles in designing and implementing learning activities that explicitly stimulate critical thinking skills. Therefore, innovation is needed in learning approaches and media that can overcome these challenges and effectively facilitate the development of critical thinking skills from an early age.

The rapid development of information and communication technology (ICT) offers great opportunities in the world of education. Interactive media, with its ability to present interesting content, facilitate active interaction, and provide constructive feedback, has significant potential to improve the quality of learning (Biantoro, O. F., 2024). Interactive media can create a more engaging and personalized learning environment, allowing students to learn according to their own pace and learning style (Cheriani, C., et al., 2024). Through interactive activities such as simulations, virtual case studies, and quizzes with answer analysis, students are encouraged to think critically in more depth, make informed decisions, and reflect on their thinking processes.

Critical thinking is an intellectual process that involves conceptualizing, applying, synthesizing, and evaluating information obtained through observation, experience, reflection, thinking, or communication, which is used as a basis for forming beliefs and taking action. (Lismaya, 2019). Critical thinking skills are one of the most valuable skills we can have. By developing these skills, we can become more independent, creative, and successful individuals in the technological era. The development of information and communication technology has significantly changed the educational landscape. One of the most prominent changes is the increasing importance of critical thinking skills in learning.

technology, with its various tools and platforms, can be a very effective means of facilitating and developing students' critical thinking skills. In this context, Lumi Education emerges as a platform or provider of educational resources that offers various types of interactive media. One of the tools integrated into the Lumi Education ecosystem is H5P (HTML5 Package). H5P is an open-source authoring tool that allows educators to create various types of rich and engaging interactive content, such as interactive quizzes, interactive videos, drag and drop, interactive presentations, and more (https://h5p.org/). H5P is an HTML 5-based web framework that provides access to a variety of interactive content such as presentations, interactive videos, memory games, quizzes, multiple choice, drag-and-drop, and others (Puspananda, D. R., et al., 2023). H5P is a free, open source, and responsive framework. H5P can be integrated with Moodle. H5P can be combined with video to provide interactive videos, namely videos from YouTube or other sources, combined with questions or other activities for students to complete. H5P is a valuable tool for educators who want to create engaging and interactive learning experiences for their students. It is easy to use and can be used to create a variety of content types.

The features offered by H5P have great potential to be designed into learning activities that specifically target the development of students' critical thinking skills (Carr, W. H., & Barry, A., 2020). For example, quiz questions with feedback explaining the reasons for correct or incorrect answers can encourage students to analyze their mistakes and understand concepts better. Interactive case study activities can train their ability to identify problems, evaluate alternative solutions, and make reasoned decisions (Carr, W. H., & Barry, A., 2020).

Although the potential of interactive media, including those based on H5P, in improving learning outcomes in general has been widely recognized, research that specifically explores the effectiveness of H5P-based Lumi Education interactive media in developing students' critical thinking skills at the Elementary School level is still limited. Therefore, this literature study is important to conduct. Through a systematic analysis of previous relevant studies on the use of interactive media (including those with similar features to H5P) in the context of elementary education and its impact on the development of critical thinking skills, this study aims to collect empirical and theoretical evidence that can support or refute assumptions about the effectiveness of H5P-based Lumi Education interactive media.

Therefore, it can be concluded that optimizing the delivery of learning materials in the classroom and developing students' critical thinking skills can be done by optimizing the use of H5P-based Lumi Education interactive learning media. Therefore, a special study (Literature Study) is needed in depth regarding the effectiveness of H5P-based Lumi Education Interactive Media to develop students' critical thinking skills in Elementary Schools. As a basis for teachers, especially in Tasikmalaya Regency, in involving interactive media in the learning process.

II. RESEARCH METHOD

This study is a qualitative study with a literature study approach that aims to analyze the effectiveness of Lumi Education interactive media based on H5P in developing critical thinking skills of students in Elementary Schools. The data sources in this study come from various relevant literature such as scientific journals, books, research reports, and other related documents that discuss interactive media, H5P, critical thinking skills, and the context of elementary education.

The informant determination technique was not used because this study did not involve the subject directly, but rather focused on document review. The research instrument was in the form of a literature review sheet compiled based on critical thinking indicators and interactive learning media components. Data collection techniques were carried out through searching, selecting, and reviewing relevant documents.

The data analysis technique used content analysis to identify patterns, trends, and relationships between concepts found in the literature reviewed. The literature study method was chosen because it allows researchers to synthesize findings from various existing studies, identify patterns and trends, and identify possible knowledge gaps. By critically analyzing previous studies, this study is expected to provide a comprehensive picture of the potential effectiveness of H5P-based Lumi Education interactive media in developing critical thinking skills of elementary school students, as well as identifying design and implementation factors that may influence this effectiveness. The results of this literature study will be a strong foundation for further empirical research that may be conducted to test the effectiveness of this media directly in the field.

III. RESULT AND DISCUSSION

Based on a literature study conducted on various accredited national journals, scientific articles, research reports, and other relevant sources, it was found that the use of interactive media, especially based on H5P through the Lumi Education platform, provides a significant contribution to the development of students' critical thinking skills at the Elementary School (SD) level. Some of the main findings from the literature study include:

A. Media Interactivity Increases Student Engagement

One of the main findings of this study shows that the use of H5P-based Lumi Education interactive media significantly increases student engagement in the learning process. This is indicated by the high level of active participation of students when using the media, both in answering questions, completing assignments, and exploring learning content independently (Miftah, M., 2022). Research by Setiawan et al. (2022) shows that H5P-based interactive media increases student motivation and engagement in the learning process. This is due to features such as interactive quizzes, drag-and-drop, and interactive videos that trigger active thinking.

One of the advantages of interactive media is its ability to increase student engagement. By using H5P, learning content

can be presented in the form of interactive quizzes, videos, and interesting educational games. Research shows that students who are actively involved in learning tend to have a better understanding of the material being taught (Hayyuningtyas, K., & Batubara, H. H., 2021). This interactive media also allows students to learn in a more enjoyable way, thereby increasing their motivation to learn. High involvement in the interactive learning process also has implications for improving students' critical thinking skills. Through this media, students are involved in activities that challenge analytical thinking, get direct feedback for self-evaluation, are encouraged to choose, compare, and make decisions from various alternative answers. This finding is in line with constructivism theory which emphasizes that meaningful learning occurs when students actively construct their own understanding through interaction with the environment and learning resources (Saputra, M. A., et al., 2024). H5P interactive media creates these conditions through digital learning experiences that encourage students to explore, try, and reflect on the material.

B. *Lumi Education as an Effective Platform for Independent and Reflective Learning*

Lumi Education based on H5P contributes significantly to improving students' ability in independent and reflective learning. Students are not only able to learn at their own pace but are also encouraged to evaluate their thinking process and understanding. Lumi Education also provides space for students to reflect on their learning process and outcomes (Jacob, T., & Centofanti, S., 2024). Automatic feedback and self-evaluation features in H5P help students recognize mistakes and understand their causes, retry learning activities with different approaches, develop metacognitive awareness, namely the ability to be aware of one's own thinking process. A study by Depany, P. D., & Sukardiyono, S. (2023) stated that Lumi Education provides teachers with flexibility in creating learning content that can be accessed at any time by students, supporting the independent learning process which is one of the indicators of critical thinking. Improving Critical Thinking Aspects Through H5P-Based Evaluation

Based on findings from Nurhayati and Damanik (2023), interactive questions presented in the H5P format tend to direct students to analyze, evaluate, and make decisions, which are the main components in the taxonomy of critical thinking. The same thing was also conveyed by Miftah, M. (2022), in his research which stated that by using H5P features such as interactive quizzes and branching scenarios, students are encouraged to analyze, evaluate, and reflect on their answers. The results of the study showed a significant increase in students' critical thinking skills after using this interactive media.

One of the important features of H5P is its ability to provide direct feedback to students. After completing an activity, students can see the results of their work and get an explanation of the right or wrong answers. This feedback is very important in the learning process because it helps students understand their mistakes and improve their understanding of the material (Eliza, T., 2019). Thus, this interactive media not only functions as a learning tool, but also as an effective assessment tool. H5P-based evaluation in

Lumi Education not only measures learning outcomes, but also develops students' critical thinking processes actively and continuously. This evaluation is an integral part of learning, not just assessment, in line with the formative approach in the applicable Curriculum.

C. *Conformity with the Curriculum*

In the context of implementing the Curriculum, interactive media such as Lumi Education based on H5P are in accordance with the principles of differentiated learning and authentic assessment. This supports the development of the Pancasila Student Profile, especially in terms of critical and creative thinking. The following is a description of the suitability of H5P-based interactive media with the applicable Curriculum:

1) *Strengthening the Pancasila Student Profile*: In strengthening the Pancasila Student Profile, one of them is "critical thinking". Lumi Education interactive media based on H5P supports this through learning activities that encourage students to analyze, evaluate, and conclude information. The use of features such as Branching Scenario and interactive Quiz that stimulate decision making and problem solving. This media directly supports the achievement of the critical thinking dimension of the Pancasila Student Profile (Fauziah, A.N.M., et al. 2024).

2) *Project-Based and Differentiated Learning:* Differentiated and project-based learning (Project-Based Learning), H5P provides a flexible learning format that can be adjusted to the needs and learning styles of students. H5P can be used as a digital project media, where students create or explore interactive real-life challenges (Wulandari, T., & Nawangsari, N. A. F. 2024). This platform allows teachers to create media that suits students' interests, readiness, and learning needs, in line with the principle of differentiation.

3) *Utilization of Digital Technology in Learning*: The current curriculum encourages the use of technology as a meaningful learning tool. The use of H5P-based Lumi Education is a concrete form of implementing a modern digital learning platform. H5P-based Lumi Education improves digital literacy and students' abilities in facing the 21st century digital world (Utami, S. R. R. 2025). This certainly supports digital transformation in inclusive and adaptive basic education.

4) *Meaningful and Contextual Learning Activities*: H5P media can be filled with local and contextual content, such as regional stories, social issues, or phenomena around students, making learning more meaningful and close to real life. Of course, it will foster a sense of empathy, social analysis, and reflection which are part of students' critical thinking. To maximize the effectiveness of Lumi Education interactive media, it is important for educators to integrate it into the curriculum systematically. Educators need to design learning activities that utilize this media with clear objectives, so that students can feel its benefits optimally. Training for teachers in using H5P is also needed so that they can utilize all available features and create an interesting learning experience for students (Hayyuningtyas, K., & Batubara, H. H. 2021).

The Role of Relevant Interactive Features in H5P

H5P features such as Interactive Video, Drag and Drop, and Quiz (Multiple Choice/True or False) allow students to not only be passive recipients of information, but also interact directly with the material. This helps students to connect the information received with previous knowledge, increase focus and attention to content, and develop an active attitude in the learning process. H5P interactive features play an important role in creating a constructive and participatory learning environment, which directly contributes to the development of critical thinking skills in elementary school students (Carr, W. H. 2021). Through interactivity, reflection, decision-making, and feedback, H5P-based media such as Lumi Education become effective tools in supporting 21st century learning.

Weaknesses Of Lumi Education Interactive Media Based On H5P

Although many studies have stated the advantages of H5P-Based Lumi Education Interactive Media in helping the learning process, it does not mean that this media does not have shortcomings or weaknesses. The weaknesses of H5P-Based Lumi Education Interactive Media:

1) *Dependence on Digital Infrastructure*: One of the main obstacles in implementing Lumi Education-based media is dependence on devices and a stable internet connection. In several elementary schools, especially in 3T (underdeveloped, outermost, and frontier) areas, limited digital facilities are a serious obstacle. The use of interactive digital media is highly dependent on the readiness of educational technology infrastructure, both in terms of hardware and internet networks (Camarini, N. P. I., et al., 2024).

2) *Limited Teacher Ability in Designing Content*: The use of H5P requires digital literacy and instructional design skills from teachers. Studies show that not all teachers are able to make maximum use of H5P features to create content that truly encourages critical thinking. Although H5P offers a variety of interactive formats, teachers often only use them superficially, such as simple quizzes, without designing complex critical thinking scenarios.

3) *Lack of Collaborative Aspects in H5P Activities*: H5P tends to focus on individual interactivity, such as answering quizzes or navigating independent materials. This has the potential to limit the development of collaboration-based critical thinking, which is an important approach in curriculum implementation. Critical thinking is not only built from individual experiences, but also from dialogue, discussion, and teamwork (Mutawa, A. M., et al., 2023).

4) *Limitations in Automatic Learning Outcome Analysis*: H5P does not yet fully provide an in-depth analytical system for student evaluation results. Although students receive automatic feedback, teachers often do not obtain analytical data that is detailed enough to map students' thinking weaknesses. The H5P platform is still limited in providing educators with in-depth insights into student performance qualitatively (Miftah, 2022).

Based on the literature findings above, it can be concluded that H5P-based interactive media through the Lumi Education platform has great potential in improving students' critical thinking skills at the Elementary School level. The advantage of H5P lies in its ability to present learning materials in an interactive form that encourages students to be active, not just passively receiving information. Overall, H5P-based Lumi Education interactive media shows significant effectiveness in developing critical thinking skills of elementary school students. By increasing student engagement, providing challenging activities, and providing constructive feedback, this media can be a very useful tool in the learning process.

Critical thinking skills are very important to develop early on because they help students solve problems, make logical decisions, and evaluate information objectively. Lumi Education media with H5P features is able to accommodate student-centered learning, where students are invited to construct their own knowledge through interaction with the media (Matana, M. D. S., et al., 2024).

However, the effectiveness of using this media is also greatly influenced by the readiness of teachers in designing meaningful content and the readiness of the technological infrastructure in schools. Therefore, teacher training in the use of Lumi Education and the provision of supporting facilities and infrastructure are important factors that must be considered.

IV. CONCLUSION

Based on the results and discussion of the literature study, it can be concluded that the H5P-based Lumi Education interactive media is effective in supporting the development of critical thinking skills of students in Elementary Schools. This media not only increases student engagement and motivation to learn, but also encourages students to think analytically, reflectively, and creatively. The integration of interactive features in Lumi Education provides a meaningful learning experience and is in accordance with modern learning principles and applicable curricula. To optimize its use, training support is needed for teachers and the readiness of technological infrastructure in the school environment. However, there are weaknesses in the H5P-based Lumi Education interactive media, namely dependence on digital infrastructure, the use of features that require content design skills, the lack of collaborative aspects in H5P activities, and limitations in automatic learning outcome analysis.

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