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Strengthening Critical Thinking of Elementary School Students through Android-Based iSpring Suite Interactive Media

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ABSTRACT

The purpose of this study is to explore the integration of technology in education, especially the use of iSpring Suite as a learning medium that supports the development of students' critical thinking skills. This study uses a literature review method by analyzing various empirical studies and relevant academic sources related to the use of educational technology and the development of critical thinking. The results of the analysis indicate that critical thinking is an important cognitive skill that allows students to analyze problems, consider multiple perspectives, and draw logical conclusions. In addition, the use of iSpring Suite in teaching through animated content and interactive quizzes has been shown to increase student motivation and engagement. The conclusion of this study is that the use of technology-based learning media such as iSpring Suite can create a more conducive, interactive, and effective learning environment, and support a deeper understanding of the material than conventional lecture methods. The implications of these findings indicate that educators need to be trained to develop and apply interactive media optimally to improve the quality of learning. Further research is recommended to test the effectiveness of the use of iSpring Suite empirically in various subject contexts and educational levels, and evaluate its impact on improving learning outcomes and developing 21st century skills more comprehensively.

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1. INTRODUCTION

Education plays a crucial role as a key instrument in advancing a nation. It serves not only to develop individual potential but also to shape character and cultivate a dignified national civilization. Through education, the intellectual capacity of a nation can be enhanced, laying the foundation for sustainable progress and societal well-being (Musfikhuna et al., 2021). Education is widely recognized

as a fundamental pillar in advancing a nation. It serves not merely as a vehicle for the transmission of knowledge, theories, and academic content, but as a transformative process that enhances the quality of life and fosters the essential values of human existence (Utomo, 2013). Education focuses on cultivating superior character through the development of logical reasoning, emotional maturity, and moral integrity. The ultimate goal is to nurture individuals of high quality and potential. Achieving quality education requires equally high-quality human resources.

The demand for highly competitive human resources places significant pressure on the education system to improve the quality of education in Indonesia, a matter of growing national concern (Ariyanti et al., 2020). The development of such human resources necessitates not only competence but also a willingness to collaborate in order to influence educational quality positively (Marenden et al., 2021). A failure in education often stems from the lack of qualifications and competencies among human resources, impeding the achievement of national educational goals as outlined in Law No. 20 of 2003.

Teachers, as the primary agents of education, are responsible for shaping students' character, capabilities, and cultural values through the learning process. Teacher-related administrative demands in Indonesia are increasing, and educators are expected to perform more effectively in shaping student success (Anam et al., 2021). In line with the goals of education—to prepare students for life—it is essential to go beyond mere lexical knowledge transfer and instead promote the development of 21st-century skills necessary for success (Chu et al., 2016).

Monotonous traditional education models are increasingly seen as inadequate, prompting the recommendation of alternative methods. Transforming lexical knowledge into conditional knowledge enables knowledge transfer and practical application in daily life, while also fostering essential 21st-century skills, including analytical thinking, metacognition, critical thinking, problem-solving, collaborative communication, and creativity (Hartanto et al., 2019); (Kim et al., 2019) ; (Saleh, 2019); (Sanabria & Arámburo-Lizárraga, 2017)). Critical thinking, as defined by (Yennita & Zukmadini, 2021) is the art of evaluating cognitive processes aimed at continuous improvement, self-monitoring, control, and correction.

Critical thinking comprises both cognitive abilities and affective dispositions (Ennis, 2018). It not only involves a set of skills but also a disposition to use them. Critical thinking on a given topic requires knowledge of that topic and the disposition to apply thinking skills. This ability equips students to navigate life more effectively, even when facing obstacles (Rahayuningrum, 2018). Critical thinking can be enhanced in schools through targeted subjects and learning strategies.

This study focuses on the topic of the solar system, which falls under the domain of physical geography and astronomy—also known as the science of celestial bodies. Astronomy is the scientific study of celestial objects and natural phenomena that occur beyond Earth's atmosphere. The core of the subject involves understanding the origin, physical and chemical properties, motion, and development of celestial bodies, as well as the formation and evolution of the universe (Pratama et al., 2021). Effective teaching of this material requires innovation to engage students and foster enthusiasm for learning. One approach is the use of unfamiliar instructional media that sparks students' curiosity.

(Wahyuningtyas & Sulasmono, 2020) emphasize that instructional media play a critical role in the teaching and learning process. Their function directly influences the effectiveness and efficiency of achieving educational objectives (Armansyah et al., 2019). Instructional media serve as tools for delivering content in a way that is accessible and understandable to students. As such, they are a key determinant of educational quality (Yanto, 2019). In recent years, the use of instructional media has shifted from conventional to modern approaches, with modern media increasingly incorporating digital technologies used by both teachers and students (Susanto et al., 2021).

Instructional media may take the form of hardware or software and serve as instruments to convey information during the teaching process (Wahyuningtyas & Sulasmono, 2020). These tools help students better comprehend complex subject matter, thus requiring teachers to carefully design and utilize media that facilitate student understanding.

(Wahyono, J., & Yumianta, 2018) highlight the rapid development of smartphone technology. Android-based smartphones are increasingly being used in education to support the creation of instructional applications (Arsyah, R. H., Ramadhanu, A., & Pratama, 2019). Android continues to dominate the global mobile operating system market due to its open-source nature, robust features, and strong developer community. Smartphones have become ubiquitous, offering diverse functionalities and educational applications that enhance the learning experience (Branchais & Rasid AchmadI, 2019).

Teachers can design Android-based instructional media using Microsoft PowerPoint in conjunction with iSpring Suite and Website 2 APK. These tools enable the transformation of PowerPoint files into mobile applications. PowerPoint, a multimedia-based presentation software, is widely used for its effectiveness, affordability, professionalism, and ease of use (Purwanti et al., 2020). iSpring Suite integrates with PowerPoint to convert presentations into HTML5 format and adds interactive features such as quizzes, videos, and audio (Handayani & Rahayu, 2020). Website 2 APK is a software tool that converts HTML5 files into apk format for Android installation.

Previous research by (Muchtar et al., 2021) found that interactive instructional media developed with iSpring Suite improved the critical thinking skills of fourth-grade students at SD Muhammadiyah 2 Mamajang Makassar. The use of technology-supported, interactive instructional media enhances the learning experience by creating an enjoyable environment conducive to the effective delivery of educational content. Android-based instructional media also help address issues of student boredom and inattention (Kurniawan & Rachmawati, 2018).

According to (Yuni Sartika, Toufan Diansyah Tambunan, 2016), using Android-based iSpring Suite 9 media to teach solar system content can significantly improve students' critical thinking skills. Audiovisual media stimulate student interest and make it easier for them to grasp science concepts. The application is designed to be user-friendly, with attractive colors, audio, and navigation, ensuring that elementary students find the learning process both enjoyable and motivating (Budyastomo, 2020). Android-based iSpring Suite media offer an effective strategy for enhancing students' critical thinking and fostering greater interest in learning. However, there has not been much research examining the implementation of iSpring Suite specifically in the context of Solar System lessons at the elementary school level, so further studies are needed to explore the effectiveness of this media in more focused learning scenarios.

Further research by (Rihani et al., 2022) demonstrated that iSpring Suite media significantly improved science learning outcomes among fifth-grade students. The proper use of instructional media aligned with learning objectives plays a vital role in improving academic achievement. Elementary students were selected for this study based on Alim's assertion that one of their defining characteristics is their enjoyment of play (Burhaein, 2017). The topic of the solar system was chosen due to a common misconception among students that Earth is the largest object in the universe (Jumadi & Hamdani, 2018).

The purpose of this study was to evaluate the effectiveness of iSpring Suite learning media in improving science learning outcomes in fifth grade elementary school students. This study specifically aims to measure the extent to which the use of iSpring Suite media can help improve students' understanding of science materials, especially the topic of the solar system. The selection of elementary school students as subjects was based on their characteristics who enjoy playing.

Although there have been many studies highlighting the benefits of iSpring Suite media in learning, there are still limitations in studies that specifically examine the effectiveness of this media in the context of Solar System material at the elementary school level. In fact, the topic of the Solar System often causes misconceptions among students, such as the assumption that Earth is the largest object in the universe (Budyastomo, 2020). This indicates the need for more targeted research in testing how iSpring Suite media can help students understand science concepts more accurately.

The purpose of this study was to evaluate the effectiveness of iSpring Suite-based learning media in improving science learning outcomes in fifth grade elementary school students. This study also aims

to determine the extent to which the use of this interactive media can help improve students' understanding of the Solar System material. In addition, this study focuses on analyzing the contribution of iSpring Suite media in increasing students' interest and motivation to learn through a fun, visual, and Android technology-based learning approach. Thus, this study is expected to provide a clear picture of the role of digital learning media in creating a more effective and interesting learning experience for elementary school students.

2. METHOD

This study uses a systematic literature review approach to explore how the use of iSpring Suite media supports the development of critical thinking skills in elementary school students. This literature review involves the process of systematic identification, analysis, and synthesis of various empirical studies, conceptual articles, and relevant educational resources. The sources were selected from leading journals, international conference proceedings, and academic books published in the last ten years (2015–2024), with a primary focus on the following four areas:

1. Critical thinking in elementary education
2. Educational media and instructional technology
3. Design and implementation of iSpring Suite as an interactive learning tool
4. The role of digital media in enhancing cognitive and metacognitive skills

Inclusion and Exclusion Criteria:

1. Inclusion

a. Articles published between 2015–2024
b. Studies focusing on elementary school students
c. Studies exploring the influence of digital media on thinking skills
d. Peer-reviewed publications (indexed journals or reputable conference proceedings)

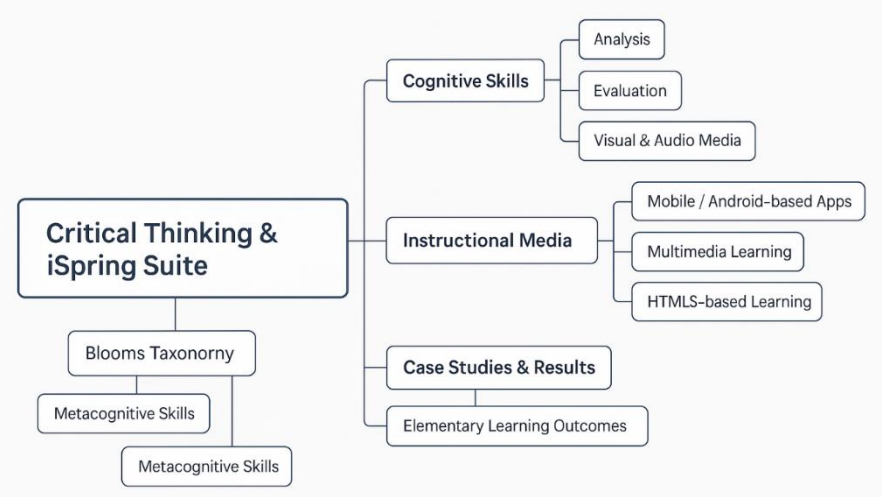
2. Exclusion

a. Studies focusing only on secondary or higher education
b. Opinion articles or essays without a strong empirical or conceptual basis
c. Sources with questionable validity or methodology

Analysis Techniques

a. Thematic Content Analysis
b. Comparison of theoretical frameworks, learning strategies, and research findings
c. Narrative synthesis to identify trends, gaps, and theoretical-practical contributions

Overall, this review included 45 articles that were selectively selected based on the inclusion and exclusion criteria that had been set. The literature reviewed was grouped into four main themes. The first theme was critical thinking in elementary education, which included 12 articles from academic journals and books that discussed theories, learning strategies, and indicators of critical thinking skills in elementary school students. The second theme focused on educational media and instructional technology, with 15 articles from international journals and conference proceedings that examined the effectiveness of various digital media in learning contexts. The third theme included 8 articles that specifically discussed the design and implementation of the iSpring Suite, including case studies and development reports that showed how iSpring was used to create interactive learning media. Meanwhile, the fourth theme related to the role of digital media in improving 21st century skills, especially cognitive and metacognitive aspects, which was reflected in 10 articles from leading academic sources. These four categories provide a strong foundation for understanding how media such as the iSpring Suite can support the development of critical thinking skills in elementary school students.



Picture 1. Review Process

This method aims to build a solid conceptual framework that connects digital media specifically iSpring Suite with efforts to foster critical thinking among young learners. It also highlights educational strategies that align with 21st-century competencies.

3. FINDINGS AND DISCUSSION

Result

a. Critical Thinking Skills

The results of the literature review show that students' critical thinking skills are very important in the learning process. These abilities include problem-solving skills, analyzing information, and drawing logical and systematic conclusions (Muchtar et al., 2021; Kamza et al., 2021). Emphasizing the importance of critical thinking skills in the world of education, especially in the student learning process. Critical thinking is the ability to evaluate information objectively, understand the relationships between concepts, and make rational decisions based on existing evidence. In the context of learning, this skill is indispensable so that students not only receive information passively, but are able to process, question, and apply it in real-world situations. That way, students can learn more deeply and meaningfully. Critical thinking skills include several important aspects, such as problem-solving skills, analyzing information, and drawing logical and systematic conclusions. For example, when faced with a problem or problem, students are required to identify the core of the problem, evaluate possible solutions, and choose the most effective approach. In the process, students must also be able to sort out relevant information and compile it into plausible arguments. By familiarizing themselves with these skills, students not only become more academically intelligent, but also prepared to face the challenges of everyday life with a critical and structured mindset.

Opinion Pertiwi et al. (2021) grouping critical thinking skills into four categories:

1. Low-level thinking skills (interpretation, explanation, assumption recognition),
2. High-level thinking skills (analysis and synthesis),
3. Complex thinking skills (induction, deduction, inference),
4. Metacognitive skills (monitoring awareness and one's own thinking strategies).

Critical thinking skills can be classified into four main categories based on their level and complexity. First, low-level thinking skills include basic abilities such as interpretation, explanation, and recognition of assumptions. Interpretation is the ability to understand and give meaning to information, while explanation refers to the ability to communicate the results of thought clearly. Assumption recognition is the ability to recognize accepted assumptions without clear evidence. Second, high-level thinking skills include analysis and synthesis. Analysis is the ability to break down information into parts to understand the relationships in it, while synthesis is the process of combining

various information into a new conclusion or idea. Third, complex thinking skills include logical and systematic thinking skills such as induction, deduction, and inference. Induction is the ability to draw general conclusions from various special cases, while deduction is the process of drawing conclusions from general principles to specific cases. Inference is the ability to infer information that is not explicitly stated. Fourth, metacognitive skills include awareness and management of one's own thought processes. This includes the ability to monitor ways of thinking as well as apply appropriate strategies in solving problems. Metacognitive skills are essential in the development of reflective and independent thinking skills. These four categories show that critical thinking involves not only logical abilities, but also self-awareness in the thought process.

Previous studies have shown varying results regarding gender differences in critical thinking skills. Several studies report that women show better critical thinking skills (Güneş et al., 2015; Kaya et al., 2017; Al-Mahrooqi & Denman, 2020). Previous studies on differences in critical thinking skills between men and women have not shown uniform conclusions. Some studies have found that there is no significant difference between genders, while others report that women have superior critical thinking skills than men. This suggests that gender factors may have an influence on critical thinking skills, but these influences may vary depending on the research context, methods used, and the characteristics of the participants. Thus, further research is needed to gain a more comprehensive understanding of the relationship between gender and critical thinking skills.

Meanwhile, other studies have stated that men are superior (Dilekli, 2017; Howard et al., 2015). Not all studies agree that women are superior in critical thinking skills. On the other hand, there are also studies that have found that men show better critical thinking skills than women. This difference in results illustrates that the influence of gender on critical thinking skills is still a debate and cannot be concluded with certainty. These diverse results can be caused by various factors, such as differences in research methods, social and cultural environment, education level, and critical thinking skill measurement approaches used in each study.

A number of studies have found no significant differences between the sexes (Bećirović et al., 2019; Hunter et al., 2014; Kettler, 2014; Liu et al., 2019). The statement means that in a number of studies, no significant or significant differences were found between men and women in terms of critical thinking skills. This means that the critical thinking skills possessed by both sexes are considered equal or at the same level, at least based on the data and analysis conducted in these studies. These findings suggest that gender may not be the main factor influencing critical thinking skills, and that other factors such as education, environment, or learning experiences may be more influential.

b. Use of iSpring Suite Media

Technology-based learning media, such as iSpring Suite, can be a means to increase learning effectiveness. iSpring Suite is software that functions as a PowerPoint add-in, which allows teachers to develop interactive learning media such as quizzes, videos, and animations (Martiningsih, 2018). This media can help simplify the process of delivering material and increase the attractiveness of learning. Technology-based learning media has an important role in increasing the effectiveness of the teaching and learning process. One example of technology that can be used is iSpring Suite, which is software that functions as an add-in to Microsoft PowerPoint. Using iSpring Suite, educators can develop a variety of engaging interactive learning media, such as quizzes, videos, and animations. These features allow for a more dynamic and easy-to-understand material delivery by students, thereby increasing their interest in learning and involvement in the learning process.

c. Improving Critical Thinking Using the iSpring Suite Application

The use of interactive media such as iSpring Suite has been shown to increase student enthusiasm and participation in learning (Syavira, 2021; Howard et al., 2015; Turabik & Gün, 2016). The use of interactive media such as iSpring Suite has been proven to be effective in increasing student enthusiasm and participation during the learning process. iSpring Suite allows teachers to present subject matter

in a more engaging and dynamic form, such as interactive quizzes, simulations, and multimedia presentations that combine text, images, audio, and video. With this more visual and participatory approach, students not only become more interested in taking lessons, but also more actively involved in the learning process. The interactivity offered by the iSpring Suite is able to create a more enjoyable and meaningful learning experience, thus encouraging students to be more focused and motivated in achieving learning goals.

Research Mansyur et al. (2018) mentioned that this media encourages students to be more active, creative, and able to think critically. The interactivity offered encourages students to be more focused, understand the material better, and engage in meaningful learning processes. This learning media plays an important role in encouraging students to become more active, creative, and able to think critically. Through its interactive features, this media creates an interesting and fun learning atmosphere, so that students are encouraged to focus more on absorbing the material presented. The interactivity also helps students in building a deeper understanding because they not only passively receive information, but also engage directly in the learning process. Thus, this media is able to create a meaningful learning experience and support the development of high-level thinking skills in students.

Discussion

The results of the study show that mastery of critical thinking skills is very much needed in today's education world, especially in facing the challenges of the 21st century that require students to think logically, systematically, and reflectively (Amin et al., 2020). Mastering critical thinking skills is a very important aspect in today's world of education. The results of various studies show that this ability has a crucial role in preparing students to face the challenges of the 21st century. In an era marked by technological advances, the complexity of problems, and the rapid flow of information, students are required to be able to think logically, systematically, and reflectively. Critical thinking skills allow them to analyze information deeply, make informed decisions, and solve problems effectively. Therefore, today's education must emphasize the development of critical thinking skills as an integral part of the learning process.

In this context, the theory of cognitive and metacognitive skills according to Amin et al. (2020) supports that critical thinking requires the activation of all levels of thinking skills - from low levels to metacognitive levels. Lower cognitive thinking skills include basic abilities such as remembering, understanding, and analyzing information. Meanwhile, metacognitive skills are related to awareness and control over the thought process itself, such as planning, monitoring, and evaluating the thought process that is being carried out. For effective critical thinking, individuals need to integrate all of these levels of thinking skills. This shows that critical thinking requires not only the ability to solve problems logically, but also requires a deep understanding of how the thought process works, as well as the ability to better reflect and organize the process.

Based on the results of previous studies, the use of interactive learning media has been shown to improve students' critical thinking skills. This is in line with the theory of constructivism which states that meaningful learning occurs when students actively build their knowledge through interactions with media, the environment, and peers. Media such as iSpring Suite provide an interactive environment and visual stimuli that support this process.

In terms of effectiveness, research by Dasmo et al. (2020) provides evidence that the use of iSpring Suite can significantly improve learners' interest in learning and critical thinking skills. The use of iSpring Suite can significantly enhance learners' interest in learning and critical thinking skills in an interactive and engaging way. iSpring Suite enables the creation of multimedia-rich learning content, such as videos, interactive quizzes, and simulations, which can make the material more engaging and easy to understand. With elements such as quizzes and interactive assignments, students are encouraged to think more critically in analyzing and solving problems. In addition, the use of iSpring Suite allows learners to learn at their own pace, increasing motivation and curiosity, which in turn improves their critical thinking skills. In this way, the iSpring Suite not only increases students'

involvement in the learning process, but also strengthens their ability to think analytically and solve problems creatively.

Interactive digital media can facilitate active and participatory learning (Fitriani et al., 2018; Cakici, 2018; Lukitasari et al., 2018; Magno, 2010; Mohseni et al., 2020). Interactive digital media can facilitate active and participatory learning by providing a more engaging experience and engaging learners directly. In conventional learning, students often receive only information from one-way teaching. However, with interactive digital media, students can participate more actively through various features, such as interactive quizzes, simulations, interactive videos, and discussion forums. This medium allows students to learn at their own pace, ask questions, and collaborate with their peers in solving problems. In this way, learning becomes more dynamic, fun, and effective in building deep understanding. In addition, interactive digital media can also adapt to various learning styles, so that every individual can feel the benefits to the fullest.

The difference in research results related to the influence of gender on critical thinking skills shows that these abilities are not solely influenced by gender, but also by students' learning approaches, environment, and learning motivation (Dilekli, 2017; Howard et al., 2015; Rodzalan & Saat, 2015; Leach, 2011). The difference in research results related to the influence of gender on critical thinking skills shows that the factors that influence these skills are much more complex and do not depend solely on gender factors. Although some studies may find differences between men and women in critical thinking skills, other factors such as the learning approach applied in the classroom, the supportive learning environment, and the student's motivation to learn play a crucial role. An active and participatory approach to learning, for example, can improve critical thinking skills in all students regardless of gender. In addition, a supportive environment such as open discussions, access to various sources of information, and opportunities to collaborate, can also encourage the development of critical thinking skills. Student motivation to learn, which can be influenced by internal and external factors, such as personal interests or support from teachers and parents, also determines the extent to which a student can develop his or her critical thinking skills. Therefore, these factors must be considered holistically in an effort to improve critical thinking skills, not just looking at them from a gender perspective.

Thus, the application of interactive media such as the iSpring Suite can be an innovative solution to improve students' critical thinking skills across the board, regardless of gender, especially if used in creatively designed and structured learning.

4. CONCLUSION

Based on the results and discussion, it can be concluded that the use of interactive media such as iSpring Suite as a teaching aid contributes positively to enhancing critical thinking skills among elementary school students. The integration of iSpring Suite interactive media in the learning process must align with and support the predetermined learning objectives. The engaging presentation offered by iSpring Suite makes it easier for students to understand the learning material. Moreover, the use of this interactive media also facilitates teachers in delivering instructional content more effectively. Therefore, further research recommendations suggest that further research further develop interactive media based on iSpring Suite as a means to improve students' critical thinking skills.

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