Analysis of Interactive Educational Puzzle Media to Improve Elementary School Students' English Language Skills

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ABSTRACT: This study aims to analyze the effectiveness of interactive edugame puzzle media in improving English language skills of primary school students. The method used is a literature study that reviews various literature and previous research results related to using interactive learning media, especially edugame puzzles, in learning English at the primary school level. The results of the analysis show that interactive edugame puzzle media has significant potential to improve students' English language skills, especially in the aspects of vocabulary, grammar, and reading comprehension. Factors contributing to this media's effectiveness include interactive elements, immediate feedback, and fun aspects that increase students' learning motivation. However, effective implementation requires careful design and support from teachers. This study concludes that interactive edugame puzzle media can be a valuable tool in English language learning in primary schools, with recommendations for further research into optimal design and implementation strategies in different learning contexts.

KEYWORDS: Interactive learning media, Interactive edugames, Puzzle media, Primary school

INTRODUCTION

The era of globalization and rapid information technology development has made mastering the English language increasingly important as an international communication tool. Language proficiency is required in the workplace and in various aspects of daily life (Mamadjanova & Malikova, 2023). Therefore, English language learning must be introduced early, especially at the primary school level, to build a strong foundation for students to master this global language. However, English language learning at the primary school level often faces various challenges. One of the main challenges is the lack of interest and motivation among students in learning a foreign language (Rofi'i, 2023). Conventional teaching methods, which tend to be monotonous and less interactive, can make students feel bored and have difficulty understanding the taught material.

To overcome these issues, innovation is needed in English language teaching methods that can attract students' interest and enhance their motivation. One approach that can be used is interactive technology-based learning media, such as edugames or educational games (Hasumi & Chiu, 2024). These interactive learning media can create a fun learning atmosphere and help students understand the material more easily. Puzzles are one form of educational game that has long been used in language learning. Puzzles can stimulate critical thinking, enhance vocabulary, and develop problem-solving skills (Pfenninger et al., 2023). By integrating puzzles into interactive edugames, it is hoped that effective and engaging learning media can be created for primary school students. The development of information and communication technology has opened up new opportunities in the development of interactive learning media. Puzzle-based edugames can be designed using various multimedia elements such as images, audio, and animations to create a richer and more immersive learning experience (Li et al., 2024). This can help students better understand the context of using the English language.

Several previous studies have shown the effectiveness of using edugames in English language learning. For example, a study conducted by Fauziyah et al. (2023), found that students who used edugames for English vocabulary learning showed a significant improvement compared to students using conventional teaching methods. In addition, the use of interactive puzzle edugame media can also support students' self-learning. With features such as direct feedback and automatic assessment systems, students can learn at their own pace and abilities (Aminah, 2018). This can help accommodate differences in learning styles and students' ability levels in one classroom. The gamification aspect in interactive edugames can also enhance students' motivation and engagement in the learning process. Elements such as point systems, badges, and leaderboards can create a healthy sense of competition and encourage students to continuously improve their abilities (Huseinović, 2024).

Furthermore, the role of teachers in implementing interactive puzzle edugame media is crucial. Teachers need to have a good understanding of how to integrate this media into the learning process, as well as provide guidance and support to students in using the media (Nurhikmah et al., 2023). Training and professional development for teachers in this aspect should be considered. Interactive puzzle edugame media can also support the development of 21st-century skills such as digital literacy, creativity, and collaboration. Through puzzle-solving activities and interactive games, students learn English and develop critical thinking skills and essential technological skills for their future (McLaren & Nguyen, 2023).

The evaluation of the impact of using interactive puzzle edugame media on student learning outcomes is also an important aspect that needs to be analyzed. Longitudinal research is needed to determine the long-term effectiveness of using this media in improving the English language skills of primary school students (Yukselturk et al., 2018). Accessibility and inclusivity aspects in developing interactive puzzle edugame media also need to be considered. This learning media must be accessible to all students, including those with special needs or limited access to technology (Estes et al., 2020). This is important to ensure equality in the learning process.

Finally, an analysis of the potential development and scalability of interactive puzzle edugame media also needs to be conducted. With the rapid development of technology, there are opportunities to integrate new technologies, such as artificial intelligence and virtual reality, into this learning media. This can open up new opportunities to enhance the effectiveness of English language learning at the primary school level. Based on the information provided, a suitable research question could be: "How can the integration of interactive puzzle-based edugames enhance motivation, engagement, and English language proficiency among primary school students, compared to conventional teaching methods?

This question explores the effectiveness of using interactive edugames as a tool for teaching English, specifically focusing on their impact on student motivation, engagement, and language skills. It also sets the stage for comparing these innovative methods with more traditional approaches, which is essential to highlight the added value of using edugames in the classroom.

METHODOLOGY

This research uses the library research method. The library research process is carried out by reviewing the literature and analyzing relevant topics combined. Library research can utilize sources such as journals, books, dictionaries, documents, magazines and other sources without conducting field research (Zed, 2008).

This method was chosen because the research focuses on analyzing and synthesizing information from various literature sources related to interactive edugame puzzle media and its use in improving primary school students' English language skills. Data sources were collected from various secondary sources, including: Books related to learning media, edugames, and English language teaching, National and international scientific journals, Previous research results (theses, dissertations) and Online scientific articles.

Translated with DeepL.com (free version) Data collection techniques in this research include: Online and offline literature searches, documentation of relevant information from the sources found and categorization and coding of data based on the main themes of the research. While the analysis technique is carried out qualitatively through literature studies, the results of the analysis are descriptive data in the form of written sentences and the results of observed behavior from the results of research conducted by previous researchers. The stages include: Data reduction, namely sorting and summarizing important information according to the research focus. The presentation of data, namely organizing data in the form of narrative descriptions and drawing conclusions, involves synthesizing findings to answer problem formulations. Data validity researchers use source triangulation techniques and discussions with peers.

RESULT

This study analyzes the effectiveness of interactive edugame puzzle media in improving English language skills of primary school students. Based on the data obtained, there are several important findings that will be discussed as follows:

English Learning Theory for Children

English language learning for children, especially primary school students, differs from adult language learning. According to Piaget's cognitive development theory, as cited by Arumsari et al. (2017), primary school-aged children (7-11 years) are in the concrete operational stage. At this stage, children begin to think logically about tangible objects and experiences but still struggle with abstract thinking.

This theory suggests that teaching methods should involve direct experiences and concrete activities in the context of English language learning. This aligns with the Total Physical Response (TPR) approach developed by Asher, where language learning is combined with physical activities to facilitate language acquisition (Adnyani, 2018).

Language acquisition in children is a rich and multifaceted phenomenon that spans multiple theoretical frameworks. The study of second language acquisition (SLA), for instance, incorporates diverse approaches like behaviorism-oriented and mentalism-oriented models. These models address key factors influencing language learning, such as learner motivation, personal characteristics, and the role of Universal Grammar (UG).

For example, Towell and Hawkins (1994) proposed a model grounded in the properties of UG, suggesting that certain grammatical features are acquired earlier than others during the SLA process (Shormani, 2014). Their model highlights how innate cognitive structures shape language learning, implying that these universal properties guide the sequence in which learners acquire new language elements.

The complexity of language acquisition also extends to the broader developmental context, shaped by psychological and developmental factors. As noted by Bloom et al. (2001), children acquire language as part of their quest to achieve causal agency, navigate daily life effectively, and integrate into society. This process is closely tied to a child's intentionality, affective and emotional growth, social interactions, and cognitive development, all of which fuel their motivation and capability to learn language.

In considering these perspectives, Shormani (2014) underscores the complementarity of mentalism and behaviorism in language acquisition. The argument holds that both innate factors (like UG) and environmental influences play crucial roles. Evidence such as the language development of children with Down syndrome and those with left hemisphere brain damage illustrates the plasticity of children's brains, which are more adaptable than adults when it comes to language learning (Laely et al., 2021).

Bloom's psychological perspective adds another layer, focusing on how cognitive processes and conceptual structures influence language development. He suggests that a genetically determined "language acquisition device" exists, enabling children to grasp complex aspects of adult language. This viewpoint emphasizes the dynamic interaction among various developmental domains, portraying children as active agents in their language acquisition journey, rather than merely passive recipients of linguistic input (Bloom et al,. 2001).

Together, these perspectives enrich our understanding of how children learn language, highlighting the interplay between innate cognitive mechanisms and the environmental context. By acknowledging both the universal and context-specific aspects of language acquisition, researchers and educators can better support children's language development.

Interactive Learning Media in English Language Teaching

Technological advancements have significantly transformed language teaching methods. Interactive learning media, including educational games, have become popular tools for enhancing the effectiveness of English language learning. According to Novaliendr and Andriani (2020) that the current generation consists of "digital natives" who have been familiar with digital technology from birth. This familiarity makes the use of interactive media effective in boosting their motivation and engagement in learning.

Research by Chen et al. (2019) indicates that using game-based language learning applications can significantly improve students' vocabulary and listening skills compared to traditional methods. These findings support the argument that interactive media can be an effective tool in English language education. And the interactive learning media offer innovative ways to enhance English language teaching. By making learning more engaging, personalized, and interactive, these tools help students develop their language skills more effectively and enjoyably.

Puzzle as a Language Learning Tool

Interactive learning media plays a crucial role in English language teaching, particularly in enhancing students' comprehension and language acquisition. According to Ambarini et al. (2018), the use of interactive media, such as visual aids and language learning software, can help clarify, establish, correlate, and coordinate accurate concepts, interpretations, and appreciations in the language classroom. Moreover, Sukhija (2013) emphasizes that language learning software provides teachers with methods for evaluating students' performance and tracking their progress, offering various activities to stimulate learners to make use of their

growing oral and written language skills. This includes features such as text chat sessions, audio-visual aids, and automatic quiz modules, which contribute to the development of listening, speaking, reading, and writing skills in language learning.

These insights highlight the significance of interactive learning media in facilitating language learning and teaching, aligning with the increasing need for effective and engaging educational tools in the modern classroom. Puzzles have long been used as educational tools, including in language learning. They can enhance critical thinking, problem-solving skills, and vocabulary retention (Ummah et al., 2023). In the context of English language learning, puzzles can help students develop their linguistic abilities while keeping them engaged and motivated.

A study by Orawiwatnakul (2023), found that using puzzles in English vocabulary learning can significantly improve students' retention and understanding. These findings highlight the potential of puzzles as a key component of interactive English learning media.

Interactive Edugame Puzzle Media Analysis

The use of interactive edugame puzzles has garnered significant attention in the realm of English language education, particularly for primary school students (Leeuw, 2018). These interactive gaming experiences have the potential to enhance various aspects of language development, from vocabulary acquisition to critical thinking skills (Franco, 2019). As the COVID-19 pandemic has accelerated the integration of technology-based learning approaches, the appeal of interactive edugames has only grown stronger, providing an engaging and adaptable medium for language instruction (Lazarou, 2024). Recent studies have highlighted the numerous benefits of incorporating interactive edugame puzzles into the English language curriculum for primary students (Free, 2022).

One such study investigated the learning and engagement of Chinese university students in teaching English vocabulary, and the results indicated that computer games with better knowledge gains than traditional methods (Souza et al., 2018). Similarly, research by Wang et al. (2022), demonstrated that educational games could engage students in the search for better answers, further validating the potential of interactive edugames in language teaching.

The interactive nature of edugame puzzles allows for a more immersive and personalized learning experience, catering to the diverse needs and preferences of primary students. By incorporating game-based elements such as challenges, rewards, and immediate feedback, these interactive puzzles can foster a sense of engagement and motivation, which are crucial for effective language acquisition (Lazarou, 2024).

Based on the theories and research discussed, interactive edugame puzzles have significant potential to enhance the English language skills of primary school students. Using these interactive puzzle games has been shown to boost students' enthusiasm for learning English. This finding aligns with research of Mayer (2019), indicating that educational games can increase student interest and engagement in learning. By incorporating puzzles into interactive games, the learning process becomes more enjoyable and less monotonous (Alchorni, 2023).

Interactive edugame puzzles are also effective in improving students' English vocabulary mastery. Research by Hilmi (2019). demonstrates that using puzzle-based educational games can significantly enhance students' vocabulary skills. Puzzles presented in various forms, such as crossword puzzles, word searches, and anagrams, help students better remember and understand new vocabulary. Additionally, using interactive puzzle-based edugames positively impacts students' reading abilities. Studies have shown that puzzle-based educational games can enhance reading comprehension skills. Puzzles embedded in short stories or paragraphs help students gradually develop their reading skills (Muhsam et al., 2023).

Interactive edugame puzzles with audio features also help improve students' listening skills. As noted by Viola et al. (2021), educational games with audio components can enhance students' listening abilities. Puzzles presented in audio format help students become accustomed to the pronunciation of English words and sentences. Although these games do not directly train speaking skills, they can help students build confidence in using English. This finding is consistent with research showing that educational games can increase students' willingness to speak English. Puzzles that encourage students to vocalize their answers can help them practice speaking skills (Trisnadewi & Lestari, 2018).

In summary, interactive edugame puzzles have proven effective in enhancing various aspects of primary students' English language skills. These tools not only boost students' motivation to learn but also help improve vocabulary, reading, and listening abilities, indirectly supporting the development of speaking skills.

CONCLUSION

An analysis of the use of interactive edugame puzzles for improving the English language skills of primary school students indicates that this method has significant potential to enhance the effectiveness of English learning. This approach not only boosts students' motivation and engagement in the learning process but also helps improve vocabulary acquisition, reading skills, and overall English language proficiency.

The use of interactive edugame puzzles aligns with second language learning theories, game-based learning, and multimedia learning principles. This method creates a supportive learning environment that facilitates natural language acquisition, increases student motivation, and presents learning materials through various effective multimedia elements.

However, it is important to note that the success of this approach also depends on appropriate design and implementation. Interactive edugames should be designed with consideration of students' proficiency levels, specific learning objectives, and effective instructional design principles.

The analysis of interactive edugame puzzle media reveals significant potential for improving English language skills among primary school students. Research indicates that gamified tools can enhance motivation and engagement, leading to improved reading and writing skills. However, the differences in performance between gamified and traditional methods were not statistically significant. Additionally, using AI chatbots in English as a Foreign Language (EFL) classrooms has significantly boosted oral proficiency and willingness to communicate, suggesting that interactive digital tools can create adaptive learning environments that cater to individual student needs. Furthermore, a study on game-based learning approaches demonstrated that students using a machine educational robot board game exhibited greater English language achievement than those using a character-based game, highlighting the effectiveness of specific game designs in fostering language skills. These findings underscore the importance of integrating interactive edugame media into language education to enhance learning outcomes.

For future research, longitudinal studies should be conducted to measure the long-term effectiveness of using interactive edugame puzzles in English language learning. Additionally, comparative research on different types of interactive edugames could provide deeper insights into the most effective educational game designs for teaching English at the primary school level.

RECOMMENDATION

In the contect of this study. Integrating interactive edugame puzzle media into English language instruction can significantly enhance students' engagement, motivation, and language skills. By focusing on thoughtful design, effective implementation, and continuous evaluation, educators can maximize the benefits of these innovative tools and support students in achieving their language learning goals. We recommend that future researchers explore discussions about the crucial role of teachers in implementing and integrating interactive edugame puzzles. However, the study does not delve deeply into the availability and quality of teacher training and professional development related to these tools, which may affect their successful adoption and use in classrooms, and using a systematic literature review.

LIMITATION

This study has several limitations. This study was conducted quantitatively using a literature review. The study's findings are based on a literature review of existing research and theoretical perspectives. This approach may not fully capture the practical challenges and nuances of implementing interactive edugame puzzles in diverse classroom settings. The effectiveness of these tools in real-world applications may vary from what is reported in the literature. Furthermore, the study highlights the potential of interactive edugame puzzles but does not account for the variability among different types of educational games. Differences in-game mechanics, content, and engagement strategies could lead to varying degrees of effectiveness, which may not be fully represented in the reviewed literature.

CONFLICT OF INTEREST

None

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