IMPLEMENTATION OF *ARTIFICIAL INTELLIGENCE* (AI) TECHNOLOGY IN ENGLISH LANGUAGE LEARNING THROUGH PUZZLE MAKER MEDIA

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Abstract: In this digital era, the use of technology in education is increasingly important to improve the effectiveness and efficiency of the learning process. AI-based Puzzle Maker is expected to be an innovative tool to overcome challenges in English language learning, especially in improving students' vocabulary and comprehension skills. The use of AI in the classroom can personalize students' learning experience and enable more effective and adaptive teaching according to individual needs, but the current challenge is the lack of understanding and skills of educators on how to use AI effectively in the classroom. This study aims to evaluate the effectiveness of the application of Artificial Intelligence (AI) technology in learning English through Puzzle Maker media at SD Muhammadiyah Ambarawa. The method of data collection was through learning outcome tests (pre-test and post-test), classroom observation, and interviews with teachers and students. The results showed a significant increase in the students' average score from 60 in the pre-test to 85 in the post-test. The percentage of students who reached the Minimum Completion Criteria (KKM) also increased from 50% to 90%. In addition, classroom observations and interviews revealed that students' engagement and motivation in learning increased significantly. Teachers find it easy to deliver material and get automatic feedback through AI-based Puzzle Maker media. In conclusion, the application of AI technology in Puzzle Maker media is effective in improving students' learning outcomes, engagement and motivation, and simplifying the teaching process for teachers.

Keywords: Artificial Intelligence (AI); Technology; English; Learning; Puzzle Maker

INTRODUCTION

In the current era of globalization, English is an international language that is needed in communicating both orally and in writing, and is even used as one of the requirements for applying for a job (Deviyanti et al., n.d.). Therefore, learning English from an early age requires an innovative approach to make the learning process more interesting and effective. one way that teachers can do this is by innovating in learning (Norhikmah et al., 2022). Learning innovation is one of the solutions that needs to be designed and implemented by educators in maximizing media such as online media (Susanti, 2020). Today's digital era, the quality of education is required to be more advanced so that it is easily accessible to all circles (Nopilda & Kristiawan, 2018).

English has been taught in Indonesia from elementary school to university level, but this does not guarantee that students do not experience difficulties in learning English. Indonesian students face several special challenges in mastering English, in the results of research conducted by (Harlina & Nur Yusuf, n.d.), said that from the beginning the special challenge

faced by students in learning English was the striking difference between English and Indonesian, especially in the pronunciation of vocabulary and sentence patterns. (Tambunsaribu & Galingging, n.d.), said that students' challenges when learning English are from the teacher or instructor factor, where teachers are often unpleasant (Strict/uncomfortable teacher) and also the learning methods used by teachers are less interactive or passive (Poor Teaching methods/Passive teacher).

The use of technology as a means of learning in the 4.0 era is a must (Walid & Nadaa, 2024). This is in accordance with the statements of darwin effendi and achmad wahidy, saying that technological developments can produce a creative and innovative learning (Effendi & Wahidy, n.d.). In addition (Rahayu Widyawati, n.d.) said the use of technology-based learning media will open up new opportunities in presenting innovative and useful learning experiences for students in facing challenges and opportunities in this evolving era. One of the recent technological developments that is currently popular is the application of artificial intelligence as a form of innovation that is used to facilitate human tasks in carrying out daily activities.

Artificial Intelligence (AI) is a term from Industrial Society 4.0 and Society 5.0 which is a "computer program, machine learning, hardware and software" (Liza Zahara et al., n.d.).Another opinion was conveyed by Sufyan and Ghofur, Artificial Intelligence is a computer system capable of performing tasks that usually require human intelligence(Sufyan & Ghofur, 2022). Artificial Intelligence (AI) allows computers to process a lot of information and data and provide computer-based conclusions in a relatively short and fast time. (Popenici & Kerr, 2017)simply defines artificial intelligence (AI) as intelligence displayed by a system, machine, or program. In recent decades, advances in computer and internet technology have made AI more relevant and can also be implemented freely in various fields such as automotive, health, finance, government, and education (Marini et al., 2022). Artificial Intelligence (AI) is believed to help humans learn better and achieve educational goals more effectively (Jurnal et al., n.d.). So, currently there are many innovations and breakthroughs based on Artificial Intelligence (AI) that will and are being applied in supporting the learning process to be more practical and effective. One of the applications of artificial intelligence in education is the application of puzzle maker media in carrying out teaching and learning activities.

The use of puzzle maker learning media has good effectiveness in improving the quality of learning. Puzzle maker comes from two words: puzzle and maker. Puzzle means a crossword game consisting of pieces of a particular image that can train creativity, order, and concentration levels (Maharani et al., 2022).While maker means maker. Puzzle maker is an application that allows users to create their own puzzles or puzzles from various images or text they choose (Febriady et al., 2022). Puzzle maker can be used to create various types of puzzles, such as
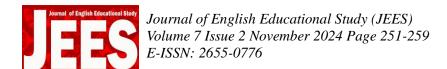
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jigsaw, cross words, soduku, criss-cross and so on. This research focuses more on the application or implementation of artificial intelligence-based learning process through the use of puzzle maker media for students with criss-cross puzzle types.

The use of AI-based puzzles in English learning has several benefits, as stated by (Putra, W. S., & Wanda, K. (2023)., n.d.), namely Puzzle maker can increase student involvement in problem solving, making students more active and enthusiastic in learning the subject matter. This activity also enriches understanding of learning concepts and builds students' cognitive skills and abilities. Meanwhile, according to (Dwi Mukti, 2023), the use of AI-based puzzles in language learning can increase student interest and motivation. Students are more interested in solving puzzles and applying language knowledge in a creative and contextualized context, thus increasing their interest in learning the language.

Some facts and realities found on the implementation of learning with artificial intelligence in the field show that teachers still find difficulties in using and developing technology in managing digital classes (Pembelajaran Artificial Intelligence Bagi Siswa Sekolah Dasar di Kota Batu et al., 2022). One of the difficulties is that teachers are unable to develop edugames that are made by themselves (Yeni & Hairi Dilfa, 2021). This is also the case at SD Muhammadiyah Ambarawa, some class teachers are still very minimal in terms of learning using artificial intelligence (AI), so teachers only teach with the lecture method. On the other hand, the use of artificial intelligence will improve the quality and access to education in many ways, including realizing more effective and personalized learning. This research focuses more on the implementation of artificial intelligence-based learning through the use of puzzle maker media with criss-cross types for students of SD Muhammadiyah Ambarawa. The things that will be examined in more depth are how the implementation of artificial intelligence-based learning through the use of puzzle maker media with criss-cross type in Muhammadiyah Ambarawa Elementary School students, as well as how the impact or influence of the implementation of artificial intelligence-based learning process through the use of puzzle maker media on the cognitive abilities of elementary school students.

METHOD

This research is a type of quasi-experimental research, Sugiyono (Sugiyono, 2012) Quasi-experiment is a study that tries to find the effect of certain variables on other variables. Quasi experiments are almost the same as actual experiments (Lestari et al., 2017). In this study, the researcher chose the quasi-experimental research method because it allows the researcher to evaluate the effectiveness of the application of Artificial Intelligence (AI) technology in learning English through Puzzle Maker media without requiring strict manipulation as in a pure experiment.

The sample in this study was collected using purposive sampling technique, in which the researcher selected subjects who were considered most suitable for the research objectives. The participants in this study were 5th grade students at SD Muhammadiyah Ambarawa, totaling 24 students. They were divided into two groups: an experimental group that used Artificial Intelligence (AI)-based Puzzle Maker media and a control group that used conventional learning methods.

While the instruments used in this study are: 1) Learning Outcome Test: This test consists of a pre-test and post-test which is used to measure the improvement of student learning outcomes before and after the application of Artificial Intelligence (AI)-based Puzzle Maker media. 2) Classroom Observation: Observations were conducted to observe students' involvement and activities during the learning process. 3) Interview: Interviews were conducted with teachers and students to get more in-depth information regarding their experience in using Artificial Intelligence (AI)-based Puzzle Maker media. This research also incorporates mixed methods where both quantitative and qualitative data are collected and analyzed. Quantitative data was obtained through learning outcome tests (pre-test and post-test), while qualitative data was obtained through classroom observations and interviews with teachers and students. This mixed methods approach was used to provide a comprehensive understanding of the effectiveness and impact of using Puzzle Maker media based on Artificial Intelligence (AI) in English language learning.

The place of this research is in one of the schools in Pringsewu district, which is located at Jl. Hm. Ghardi No. 29 Ambarawa, Ambarawa, Kec. Ambarawa, Kab. Pringsewu Prov. Lampung. The reason the researchers took this school as a research location, because this school already has learning facilities that can support learning activities, such as having an LCD and projector. While researchers took a sample of 1 teacher who taught English. The research implementation process was applied to fifth grade students at SD Muhammadiyah Ambarawa which amounted to 24 students.

FINDING AND DISCUSSION

This study was conducted to evaluate the effectiveness of the application of Artificial Intelligence (AI) technology in learning English through Puzzle Maker media at SD Muhammadiyah Ambarawa grade V. The results of this study were obtained through data collection from student learning outcomes tests, classroom observations, and interviews with teachers and students. The results of this study were obtained through data collection from student learning outcome tests, classroom observations, and interviews with teachers and

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students. The data showed a significant increase in students' average score after the use of Artificial Intelligence (AI)-based type Puzzle Maker media.

Table1. Result of Pre-test and post-test

Aspek	Pre-test	Post-test
Average Score	60	85
Passing Percentage	50%	90%

From the table above, it can be seen that the average value of the pre-test was 60, while the average value of the post-test increased to 85. In addition, the percentage of students who achieved scores above the Minimum Completion Criteria (KKM) increased from 50% in the pre-test to 90% in the post-test.

Tabel 2. Result of Observation

Student engagement and motivation	Class observation
Active and Motivated	Increased

From the observation and table above, it is known that students are more active and motivated in participating in English learning and they look more enthusiastic in completing the tasks given through the Puzzle Maker.

Table 3. Results of interviews with teachers and students

Interview with teacher	Interview with student
1. Material delivery: Easier with a variety of exercises 2. Automatic Feedback: Helps teachers manage and assess students	More interested and enthusiastic

Interviews with students showed that they felt more interested and motivated to learn English using Puzzle Maker. Some students stated that learning became more fun and challenging. While the results of interviews with fifth grade English teachers, stated that the use of artificial intelligence (AI) in Puzzle Maker media makes it easier for them to deliver material and manage the class. Teachers can easily create a variety of exercises that suit students' abilities, and get automatic feedback on students' progress.

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The use of Artificial Intelligence (AI) technology in Puzzle Maker media is effective in improving student learning outcomes. This is in line with previous research which shows that the use of interactive technology can increase student engagement and motivation in learning. Puzzle Maker media using artificial intelligence (AI) provides interesting challenges and variety of exercises for students. This helps to keep students' attention and makes the learning process more enjoyable. Artificial Intelligence (AI) in Puzzle Maker allows teachers to differentiate learning more easily. Teachers can provide exercises that are tailored to students' individual abilities, so that each student can learn at his or her own pace and ability. One of the main advantages of implementing Artificial Intelligence (AI) is the ability to provide automatic feedback and assessment. This not only reduces the teacher's workload, but also provides useful information to improve learning strategies. While this research shows positive results, there are some limitations and challenges that need to be addressed. One of them is the need for adequate technology infrastructure. In addition, not all teachers and students have sufficient technology skills, so additional training and support is needed.

Then, the most significant finding in this study is that the use of AI-based Puzzle Maker significantly improves students' English language skills, especially in terms of vocabulary and reading comprehension. AI-based Puzzle Maker provides an interactive and adaptive learning experience, which helps students understand the material in a more engaging and personalized way. For students, this means they can learn in a way that is more enjoyable and suited to their individual needs, while for teachers, this technology can be used as an effective tool to optimize the learning process and reduce the burden of repetitive teaching.

CONCLUSION

The results of this study show that the application of Artificial Intelligence (AI) technology in learning English through Puzzle Maker media at SD Muhammadiyah Ambarawa is effective in improving student learning outcomes. Data from the pre-test and post-test results showed a significant increase in students' average scores, as well as the percentage of students who reached the Minimum Completion Criteria (KKM) increased. This indicates that the use of Artificial Intelligence (AI)-based Puzzle Maker media can help students understand the material better and improve their academic performance.

In addition to the improvement in learning outcomes, this study also found that students' engagement and motivation in learning English increased significantly. Classroom observations showed that students were more active and enthusiastic in following the lesson when using Puzzle Maker media. Interviews with students also confirmed that they felt more interested and motivated in learning English through this method. Thus, artificial intelligence (AI) based

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Puzzle Maker media not only makes learning more effective but also more fun and interesting for students.

From the teacher's perspective, the use of artificial intelligence (AI) in Puzzle Maker media simplifies the teaching and assessment process. Teachers can easily create exercises that vary according to each student's ability and get automatic feedback that is useful for monitoring student progress. Although this study showed positive results, there are challenges such as the need for adequate technology infrastructure and technology skills training for teachers and students. Therefore, to maximize the benefits of this technology, there is a need for more support in terms of technology facilities and training.

Teachers are advised to strategically utilize AI technology to enrich their teaching practices. First, teachers can use AI-based tools, such as Puzzle Maker, to create learning materials that are adaptive and customized to each student's needs, so as to help identify their weaknesses and strengths in learning. Teachers can also use AI to provide automatic and real-time feedback, allowing students to immediately know the results and understand their mistakes, as well as correct their understanding independently. By integrating AI into the classroom, teachers not only improve efficiency but can also create a more engaging and personalized learning experience.
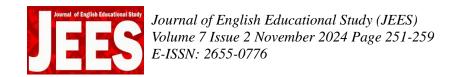
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