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AI- Assisted scaffolding: AI Implementation in English Speaking Communication

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Abstract: This study investigates the impact of integrating Artificial Intelligence (AI) into a Project-Based Learning (PjBL) model to enhance students' English speaking skills. Recognizing the persistent challenges in providing sufficient speaking practice opportunities in conventional classrooms, this research employed AI-based applications, including Character AI, TikTok, and video editing tools, to create an interactive and personalized speaking environment. This study examines the integration of Artificial Intelligence (AI) into a Project-Based Learning (PjBL) model to enhance students' English speaking skills. The research was motivated by the limited opportunities for speaking practice in conventional classrooms. AI-based applications such as Character AI, TikTok, and video editing tools were employed to create an interactive and personalized learning environment. A total of 60 students participated in the study, divided into a control group applying conventional PjBL and an experimental group applying AI-assisted PjBLThe study involved 60 students divided into two groups: a control group applying conventional PjBL and an experimental group using AI-assisted PjBL. Data were collected through pre- and post-tests and analyzed using SPSS with descriptive statistics, normality testing, and independent samples t-test. The results revealed that the AI-assisted PjBL group achieved a higher mean speaking score ($M = 82.00$, $SD = 6.103$) compared to the control group ($M = 72.00$, $SD = 5.038$), with a statistically significant difference ($t = 6.922$, $p < 0.05$). These findings indicate that integrating AI in PjBL can significantly improve students' speaking performance by providing adaptive feedback, increasing learner autonomy, and creating more authentic speaking practice opportunities. However, the study also highlights limitations, including restricted AI platforms and a relatively short experiment duration. The findings suggest that AI-assisted PjBL is a promising approach for enhancing speaking skills in higher education, but it should be complemented with extended practice and teacher facilitation to achieve optimal outcomes.

Keywords: Artificial Intelligence, Project-Based Learning, Speaking Skills

Introduction

Verbal communication is an important element in mastering a language, as verbal language is a characteristic of someone's proficiency in a language. Similarly, mastering English, which is a global language used not only in the academic world but also in the world of work, business, and international interaction, is crucial. Speaking ability is one of the important aspects of learning English. Bailey (Bailey, 2003) stated that speaking is an oral skill consisting of producing systematic linguistic expressions to convey meaning. However, in reality, many students still struggle to improve their speaking skills. One of the reasons for this is the lack of opportunities for students to practice speaking in English. Time

and resource constraints often pose obstacles to creating a conducive learning environment for speaking practice. From the results of this observation, it is evident that the limited time in class results in insufficient opportunities for all students to practice. Additionally, the teacher-centered teaching method, which still dominates, is also less effective in improving students' speaking abilities.

However, in practice, many learners continue to face significant challenges in improving their speaking skills. One of the main contributing factors is the limited opportunities to practice English in authentic communicative settings (Harmer, 2007). Time constraints during formal classroom instruction often hinder the provision of adequate speaking practice for all students. Teachers may prioritize other language components, leaving minimal time for interactive speaking activities. Furthermore, the predominance of teacher-centered teaching methods, which focus more on knowledge transmission rather than learner interaction, has been found to be less effective in developing communicative competence (Richards, 2015). These challenges highlight the urgent need for more innovative, student-centered approaches that provide frequent, meaningful, and interactive speaking opportunities to enhance learners' oral proficiency.

The development of artificial intelligence (AI) technology has opened up new opportunities in the world of education. AI can be utilized to develop various applications and platforms that can assist students in learning English, including improving their speaking skills. AI has the ability to provide automatic and personalized feedback to students, enabling them to learn independently and effectively. This is supported by research conducted (Haryadi et al., 2023) which states that many applications and software are specifically designed to improve English language skills. This study aims to examine the application of AI in student speaking practice to enhance their speaking skills. This research will explore various available AI applications and platforms, as well as their effectiveness in improving students' speaking abilities. Additionally, this study will identify the challenges and opportunities in applying AI for student speaking practice.

Recent studies have highlighted that AI-powered language learning platforms, such as Duolingo, ELSA Speak, and ChatGPT-based speaking assistants, significantly contribute to improving learners' pronunciation and oral fluency (Rahma Widi, Annisa Tasyakurna M, 2025). These platforms utilize speech recognition technology and natural language processing (NLP) to assess students' pronunciation, provide instant corrective feedback, and adapt learning materials based on individual performance However, several challenges remain in implementing AI for speaking practice. Research by (Gilmara Oliveira Maquiné, Iandra Maria Weirich da Silva Coelho, 2020) emphasizes that while AI-based tools are effective in developing pronunciation and vocabulary, they are less capable of fostering natural conversational skills and spontaneous interaction without the guidance of a teacher. Additionally, Bajorek pointed out that speech recognition technologies in many AI applications still face accuracy issues, especially when dealing with diverse accents and speech variations. Therefore, the integration of AI in language learning should be seen as a complementary tool rather than a replacement for traditional speaking instruction (Bajorek, 2017). Combining AI-based practice with teacher-facilitated communicative activities may offer the most effective approach to improving students' speaking competence. Based on the existing background of the problem, the researcher is using several applications to

support the teaching and learning process in the classroom. The applications used are Gemini, Character AI, video editing applications, and social media. The combination of all these applications will result in a video of the learning experience, particularly in speaking skills practice.

This research will examine the effectiveness of AI implementation in improving students' speaking abilities, as well as the challenges and opportunities in using AI for students' speaking practice. The scope of this research is to improve students' speaking skills. This study aims to examine the application of AI in students' speaking practice to enhance their speaking abilities. The benefit of this research is to improve students' speaking skills. This research will explore various available AI applications and platforms, as well as their effectiveness in improving students' speaking abilities. Additionally, this study will also identify the challenges and opportunities in implementing AI for students' speaking practice.

Speaking ability, or speaking skill, is one of the key components in mastering a foreign language, particularly English, which is crucial for effective communication in various academic and professional contexts. In language learning, speaking is not merely the production of sounds or words, but a complex process involving linguistic aspects such as grammar and vocabulary, as well as paralinguistic aspects like intonation, stress, and pauses. The importance of mastering speaking skills is increasingly emphasized, considering their role as an indicator of successful interpersonal and intercultural communication. Therefore, various learning efforts and strategies continue to be developed to help students improve their speaking abilities so they can confidently and fluently convey ideas, argue, and interact.

Recent empirical studies further highlight the role of technology in improving speaking abilities. For instance, Perwitasari ((Perwitasari & Prasetia Bakti, 2022) demonstrated that the integration of creative digital tools in English learning enhanced students' speaking performance in terms of pronunciation, vocabulary, and grammar. Similarly, imilarly, Nuriyanti (E. Nurhayati & Maman Suryaman, 2024) found that the use of video media significantly improved junior high school students' speaking skills by providing visual context and authentic input, which increased their confidence and fluency. In another study. In another study, Herlisya and Wiratno (Herlisya & Wiratno, 2022) showed that the implementation of AI-based applications such as *Hablo* not only increased students' speaking scores but also boosted their motivation and classroom participation. Likewise,the other study) reported (Murad et al., 2023) that digital storytelling activities were effective in enhancing students' speaking fluency and motivation, indicating the importance of interactive and meaningful learning contexts. In higher education, revealed that the use of a digital storytelling project supported by Google Classroom improved students' speaking proficiency by encouraging collaboration, creativity, and contextualized communication (Ni Made Lisma Martarini et al., 2020).

The problem-solving approach the researcher will use here is to utilize several AI-based applications to support students' speaking skills, including TikTok, Character AI, and video editing applications. This is based on several previous studies that used AI as a supporting application for learning. The novelty of this research lies in the utilization of AI applications in teaching English speaking skills. According to Lee in Abimanto (Abimanto

& Mahendro, 2023), AI in language education can provide adaptive learning experiences, personalized instruction, and targeted feedback, allowing learners to progress at their own pace. The research (Maulana & Royal, 2024) was based on improving speaking skills thru project-based learning. The main objective of this research is to determine the impact of Project-Based Learning (PjBL) on improving students' speaking abilities. This research was conducted with students, involving 32 participants. The research data consists of qualitative data obtained thru questionnaire analysis and interviews. The results of this study indicate that the influence of Project-Based Learning can improve students' speaking abilities. From the results of research conducted by Firdaus (Firdaus & Septiady, 2023), the analysis shows that there is a significant influence of Project-Based Learning on students' speaking abilities. This method is effective in teaching speaking because it improves students' speaking abilities, builds their teamwork skills, enhances their problem-solving skills, and encourages them to be active, communicative, creative, and innovative.

The other research(Nurmalasari, 2024) aims to provide an overview of how Speak.google can be used to help EFL students learn to speak English. This research employs qualitative descriptive research. This research shows that Speak. Google can help ESL students learn the language by assisting them in learning and practicing spoken English. This AI provides students with instant feedback and a variety of alternative answers.

Research (Safiri, 2021) shows that the implementation of AI can have a significant impact on improving the quality of English language learning, particularly in the initial stages of university studies, if it is properly integrated into the curriculum and supported by adequate facilities and training.

Methodology

The research will be conducted using the PBL (Project-Based Learning) method, commonly referred to as project-based learning. As for the activity steps, they are as follows: (1) socialization with students for project determination and preparation, where the project will be directed toward a short video containing learning experiences, (2) implementing the project according to the agreement, and (3) publishing the project results. During project determination and preparation, students will be invited to discuss the preparations and how the activities will be carried out. The activity will be carried out in several stages, some of which conducted directly in the classroom during learning, while other stages of completion and preparation will be done at home. The second stage is to implement the projects. The projects will be carried out in several stages, starting with training using the TikTok application called the Reading Challenge. Here, students will record themselves reading at a certain speed and, of course, with correct pronunciation. Next, students practiced speaking using "Character AI." Of course, there are procedures to follow when using this application. First, students will practice using it with a friend who will record and also serve as a peer tutor. This exercise is conducted over 3 meetings and concludes with live speaking using this application in the classroom. All activities will be recorded as material for video creation. At the end of the activity, students must create a short video by adding live speaking within the video about their experience using Character AI during the training. The final stage is publication, which in this activity is carried out in two steps: watching the

video together in class and posting it on social media. Here are the stages in this research, divided into several steps from observation to data processing. What is being carried out here is quantitative. According to Isnawan (Isnawan et al, 2020), there are several examples of quantitative research types, such as: surveys and experiments. One of the hallmarks of experimental research design is random assignment. So, this research is an experimental study. This research design was used because it was not possible to control the group design. The research sample for this study is the even semester students of INSTIKI. The variables in this study are independent variables with 2 dimensions: conventional learning models, which in this study is PJBL, and AI-assisted PJBL. Data collected from pre-test and post-test scores.

Result and Discussion

In the Results section, summarize the collected data and the analysis performed on those data relevant to the issue that is to follow. The Results should be clear and concise. It should be written objectively and factually, and without expressing personal opinion. It includes numbers, tables, and figures (e.g., charts and graphs). Number tables and figures consecutively in accordance with their appearance in the text.

This study involved two learning groups: a Project-Based Learning (PjBL) group and a Project-Based Learning with Artificial Intelligence (PjBL with AI) group, each consisting of 30 respondents. The main objective of this study is to examine the differences in English speaking ability between the two groups after the treatment. Data was obtained from the speaking test scores administered after the treatment was completed. The analysis was conducted using SPSS software to determine data trends descriptively and their normality distribution.

All figures and tables should be cited in the main text Table 1,

Table 1. SPSS results of AI-assisted PJBL

Speaking score	**result**	
mean	82.00	1.114
median	82.00	
variance		
Std. deviation	37.241	
Maximum	6.103	
	92	
minumum	72	
Skewness	,000	,427

The group using the PjBL approach with AI assistance showed an average (mean) speaking ability score of 82.00 with a standard deviation of 6.103, indicating moderate data variation. The maximum score achieved by participants in this group was 92, while the minimum score was 72, resulting in a score range of 20. The median and mean of this group are the same, which is 82.00, indicating a symmetrical data distribution. The skewness value

of 0.000 and kurtosis of -1.021 support this finding, indicating that the data is not skewed to either side and tends to be flatter than a normal distribution.

Table 2. SPSS results of PJBL

Speaking score	result	
mean	72.00	1.114
median	72.00	
variance		
Std. deviation	25.379	
Maximum	5.038	
	64	
minimum	80	
Skewness	,000	,427

Meanwhile, the group that only used the PjBL approach without AI support scored an average of 72.00, which was lower than the first group. The standard deviation in this group is 5.038, indicating a slightly lower spread of data compared to the group with AI. The minimum and maximum values are 64 and 80, respectively, with a range of 16. Similar to the first group, the median and mean values are the same, at 72.00, which indicates a symmetrical distribution of values. The skewness and kurtosis of this group are 0.000 and -0.943, respectively, which also indicates a distribution pattern approaching normal.

Tabel 3. Test Normality- Kolmogorov-Smirnova

Statistic	df	Sig.	Statistic	df	Sig.
,137	30	,155	,933	30	,061
,153	30	,071	,918	30	,023

Normality testing was conducted using two methods: Kolmogorov-Smirnov and Shapiro-Wilk. The test results showed that the PjBL with AI group had a significance value of 0.061 (Shapiro-Wilk), which was above the significance level of 0.05, so it can be concluded that the data was normally distributed. The PjBL without AI group showed a significance value of 0.023 (Shapiro-Wilk), which was below 0.05, indicating that the data in this group was not fully normally distributed. However, because the sample size is sufficient and the distribution shape is not too skewed, parametric analysis can still be used cautiously.

To determine the difference in speaking ability scores between the two groups, the Independent Samples t-test was used. The analysis results showed a significant difference between the two groups with a t-value of 6.922 (df = 58) and a significance level of p = 0.000 (p < 0.05). The average score difference between the two groups is 10,000 points, with the PjBL with AI group significantly outperforming the other. The 95% confidence interval for the mean difference is between 7.108 and 12.892, which does not include zero, further strengthening the conclusion that the PjBL approach with AI support yields better results in improving students' speaking abilities.

Discussion

The results of this study indicate that the application of artificial intelligence (AI) in project-based learning (PjBL) has a significant impact on improving students' speaking abilities. This is evidenced by the quite striking difference in average scores between the experimental group (PjBL with AI) with a mean of 82.00 and the control group (regular PjBL) with a mean of 72.00. The results of the independent sample t-test also show a significance value of 0.000 ($p < 0.05$), indicating that the difference is statistically significant. This finding proves that integrating AI into the learning process can be a solution to the limited time for speaking practice in class, which has been a major problem as identified in the proposal.

The learning model used in this research, which is a combination of PjBL and the use of AI applications such as Character AI and social media (e.g., TikTok), is designed to provide a more flexible, personalized, and interactive speaking practice space. Based on the data obtained and project implementation documentation, students appeared more active in exploring the material and more confident when practicing speaking, as they were assisted by the automatic feedback from the application used. This aligns with Lee's opinion (Abimanto & Mahendro, 2023), who stated that AI in language education can provide adaptive learning experiences and targeted feedback tailored to students' needs.

Furthermore, these findings are also consistent with (Nurmalasari, 2024) research, which shows that using AI platforms like Speak. Google can provide instant feedback and alternative answers that help students learn to speak English independently. In the context of this research, practicing with Character AI provides students with the opportunity to continuously record, review, and improve their speaking performance, an approach rarely available in conventional classrooms. This shows that AI integration is not only complementary, but can also be a more active and reflective learning facilitator. As the other study said that the integration technologi can make the motivation higher (Lisma, Yulianti, 2021).

The application of AI in the context of PjBL also demonstrates the novelty of the learning approach, as it allows students not only to work on academic projects but also to creatively reflect on their learning process thru digital media. Thru a short video project that combines speaking practice and reflection, students are trained to use English in real-world contexts while simultaneously building critical thinking and digital literacy skills. Firdaus and Septiady stated that PjBL is effective in improving speaking because it supports cooperation, creativity, and active communication—and this finding is further strengthened by the support of AI technology, which makes the process more effective and engaging (Firdaus & Septiady, 2023).

From a learning theory perspective, this application reflects the principles of social constructivism, where learners construct meaning thru active interaction with their environment—both human and technological. AI here acts as a new learning agent, enabling two-way interaction between students and machines and helping to fulfilll Vygotsky's principle of the zone of proximal development (ZPD). Additionally, this strategy

also addresses the needs of 21st-century learning, which emphasizes mastery of technology, creativity, communication, and collaboration in a global context.

Overall, the results of this study not only provide empirical evidence of the effectiveness of AI in speaking instruction but also reinforce the urgency of transforming language teaching methods in higher education. The use of AI allows students to practice more independently, receive immediate feedback, and build speaking skills thru contextual and meaningful projects. This research contributes to the development of technology-based learning models and serves as a reference for lecturers in designing innovative learning that is adaptable to the challenges of the digital era.

The results of this study support constructivism and social constructivism theories, which emphasize the importance of active interaction and experiential learning in language skill development. AI technology serves as a modern scaffolding that expands students' learning space beyond the traditional classroom. Thus, this research provides a strong theoretical foundation for a project-based learning model integrated with digital technology, particularly AI. Practically, these findings can serve as a reference for lecturers, educators, and policymakers in designing more effective and contextual English language learning. The use of AI-based applications such as Character AI, social media, and video editing platforms allows students to gain repetitive and meaningful speaking practice. The result study The results of data analysis (Putri et al, 2023) indicate that the use of AI in student learning has significant potential for improving the quality of education. Additionally, this approach also facilitates creative and collaborative learning, as well as boosts students' confidence and motivation in speaking English. This AI (Zahara et al, 2023) system helps create learning profiles for each student, allowing learning materials to be tailored to each student's abilities, learning style, and experience. Artificial intelligence (AI) (Nurhayati et al, 2024) is one alternative that has the potential to overcome educators' difficulties in personalizing learning. This will help educators create more engaging and interactive learning materials tailored to the needs of the students. This literature review research will show that integrating AI into collaborative learning is very effective in increasing students' motivation to understand the material being studied.

The implementation of AI technology in education makes it easier for educators in various matters, especially in administrative areas such as determining final grades based on weights and assessments, creating more active learning, and simplifying the tasks of teachers and students in teaching and learning activities.

This research has several limitations, including the use of AI applications being limited to certain platforms and the relatively short duration of the experiment. Additionally, other aspects of speaking skills such as direct interaction with native speakers or more complex conversational contexts have not been fully facilitated in this research activity. Therefore, generalizing these findings needs to be done with caution.

Conclusion

This research proves that the application of Artificial Intelligence (AI) in the Project-Based Learning (PjBL) model can significantly improve students' English speaking abilities. This is demonstrated by the difference in average scores between the experimental group (PjBL with AI) and the control group (PjBL without AI), which shows statistically significant results. The use of AI provides a more personalized, flexible, and adaptive learning experience for students to practice their speaking skills independently and repeatedly.

Here are some suggestions that can be made: For Lecturers and Educators: Lecturers are highly encouraged to adopt and integrate AI technologies, such as Character AI and social media (e.g., TikTok), into English language learning strategies, particularly to improve. Designing student-centered learning activities that utilize the automatic and personalized feedback features of AI applications to facilitate more intensive and independent speaking practice. Considering the use of a Project-Based Learning model combined with AI to create a more authentic, collaborative, creative, and relevant learning experience for students in the context of real life.

For Students, proactively utilize various AI applications and platforms available to practice and improve speaking skills independently outside of class hours. Increase initiative to engage in AI-based projects that encourage speaking practice and reflection on learning experiences.

Several practical recommendations can be proposed. Lecturers should integrate AI tools into their English teaching practices by designing project-based activities that utilize features such as automatic feedback, gamification, and interactive speaking exercises to maximize student engagement. Students are encouraged to make use of AI applications beyond classroom settings to extend their practice time and foster independent learning habits. Institutions are advised to provide training and infrastructure that support the effective use of AI technologies in language learning. Finally, researchers are recommended to continue exploring diverse AI platforms and instructional models to further enhance the development of students' speaking competence in higher education.

For Future Research, conduct further research with a longer experimental duration and a wider range of AI applications to test its effectiveness more comprehensively. Exploring other aspects of speaking skills that were not fully facilitated in this study, such as direct interaction with native speakers or more complex conversational contexts, to gain a more holistic picture. Investigating other factors that might influence the effectiveness of AI implementation in language learning, such as student motivation, initial proficiency level, or the type of instructor support provided.

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