

STUDENT'S LEARNING EXPERIENCE WITH ELSA SPEAK IN AI-ASSISTED PROJECT-BASED LEARNING FOR SPEAKING

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ABSTRACT

The integration of Artificial Intelligence (AI) into English language learning has the potential to improve speaking skills. However, research on students' learning experiences with ELSA Speak in AI-Assisted Project-Based Learning (PjBL) at the junior high school level remains limited. This study aims to explore students' learning experiences with ELSA Speak in speaking instruction. The study employed a qualitative approach involving eight eighth-grade students at a junior high school in Karawang. Data were collected through semi-structured interviews and analyzed using the Miles, Huberman, and Saldaña model. The results revealed four main themes: positive learning experiences, benefits to speaking skills, AI-supported learning processes, and challenges encountered during learning. ELSA Speak helps improve students' pronunciation, speaking fluency, self-confidence, and readiness to complete projects. Although there were some obstacles, the students felt that the benefits of using ELSA Speak outweighed the challenges they faced. These findings suggest that ELSA Speak has the potential to support more interactive and student-centered speaking instruction. Overall, ELSA Speak can support more interactive and student-centered speaking instruction within AI-Assisted Project-Based Learning. English teachers are encouraged to integrate AI-based applications into project-based speaking activities to provide students with more opportunities for independent practice and immediate feedback.

Keywords: artificial intelligence (AI), ELSA speak, project-based learning, speaking, student learning experiences

ABSTRAK

Integrasi *Artificial Intelligence (AI)* dalam pembelajaran bahasa Inggris berpotensi meningkatkan keterampilan speaking. Namun, penelitian mengenai pengalaman belajar siswa dalam penggunaan ELSA Speak pada *AI-Assisted Project-Based Learning (PjBL)* di tingkat sekolah menengah pertama masih terbatas. Penelitian ini bertujuan mengeksplorasi pengalaman belajar siswa dalam menggunakan ELSA Speak pada pembelajaran speaking. Penelitian menggunakan pendekatan kualitatif dengan melibatkan delapan siswa kelas VIII di salah satu sekolah menengah pertama di Karawang. Data dikumpulkan melalui wawancara semi-terstruktur dan dianalisis menggunakan model Miles, Huberman, dan Saldaña. Hasil penelitian menunjukkan empat tema utama, yaitu pengalaman belajar yang positif, manfaat terhadap kemampuan speaking, proses pembelajaran yang didukung AI, dan tantangan selama pembelajaran. ELSA Speak membantu meningkatkan *pronunciation*, *speaking fluency*, kepercayaan diri, dan kesiapan siswa dalam menyelesaikan proyek. Meskipun terdapat beberapa kendala, siswa menilai manfaat penggunaan ELSA Speak lebih besar daripada tantangan yang dihadapi. Temuan ini menunjukkan bahwa ELSA Speak berpotensi mendukung pembelajaran speaking yang lebih interaktif dan berpusat pada siswa. Secara keseluruhan, ELSA Speak dapat mendukung pembelajaran speaking yang lebih interaktif dan berpusat pada siswa dalam implementasi *AI-Assisted Project-Based Learning*. Oleh karena itu, guru bahasa Inggris disarankan mengintegrasikan aplikasi berbasis *Artificial Intelligence (AI)* ke dalam kegiatan pembelajaran berbasis proyek untuk memberikan lebih banyak kesempatan kepada siswa berlatih secara mandiri dan memperoleh umpan balik secara langsung.

Kata Kunci: *artificial intelligence (AI)*, ELSA speak, *project-based learning*, *speaking*, pengalaman belajar siswa

A. Introduction

Speaking is one of the most important skills in English language learning because it reflects students' ability to convey ideas, opinions, and information effectively in various communicative situations. Richards (2008) explains that speaking is not only related to the ability to produce utterances but also to the ability to convey meaning accurately in accordance with the purpose and context of communication. In line with this, Brown (2001) states that speaking is a productive skill that requires mastery of vocabulary, grammar, pronunciation, and fluency through continuous practice. However, speaking skills remain a challenge for many students, particularly in the context of English as a Foreign Language (EFL). Limited vocabulary, pronunciation difficulties, fear of making mistakes, and low self-confidence often hinder students from actively participating in speaking activities (Tuan & Mai, 2015). In addition, affective factors, such as speaking anxiety and a lack of self-confidence, also affect students' speaking performance (Derakhshan et

al., 2020). These conditions indicate that speaking instruction requires strategies that not only develop language skills but also encourage active participation, build self-confidence, and provide opportunities for meaningful practice.

Advances in digital technology have opened up new opportunities in language learning through the use of Artificial Intelligence (AI). According to Godwin-Jones (2021), AI supports more personalized learning by providing automated feedback, tailoring content to students' needs, and offering opportunities for independent study. Previous research has also shown that AI can improve linguistic skills, such as pronunciation and fluency, while simultaneously boosting students' motivation, engagement, and self-confidence (Zou et al., 2023). Furthermore, technology based on Automatic Speech Recognition (ASR) can provide immediate feedback, thereby creating a more interactive learning experience (Xiao, 2025). Bhar (2026) also emphasizes that AI can support the development of speaking skills by providing flexible practice

opportunities and complementing the teacher's role in the learning process.

One of the most widely used AI-based apps for English language learning is ELSA Speak (English Language Speech Assistant). This app utilizes Automatic Speech Recognition technology to analyze users' pronunciation and provide feedback on pronunciation, intonation, word stress, and fluency, enabling students to improve their speaking skills through repeated practice (Widyasari, 2023). Aryanti and Santosa (2024) reported that ELSA Speak consistently improves EFL learners' pronunciation skills through accurate and personalized feedback. These findings are supported by Aulia (2025), who stated that the integration of AI, including ELSA Speak, can create a more flexible learning experience and support independent pronunciation practice. Other studies also indicate that the use of ELSA Speak contributes to improvements in students' speaking performance, learning motivation, and self-confidence (Alwin et al., 2024; Ribhan et al., 2025; Winduastuti et al., 2025; Yuliana, 2025). However, most studies still focus on the app's

effectiveness or user perceptions, while students' learning experiences when ELSA Speak is integrated into project-based learning have rarely been examined.

One approach considered effective for developing speaking skills is Project-Based Learning (PjBL). Thomas (2000) defines PjBL as a student-centered approach involving the completion of projects related to real-world problems. Bell (2010) adds that PjBL not only enhances academic knowledge but also develops critical thinking, communication, collaboration, creativity, and independent learning skills. In language learning, projects provide students with opportunities to use the target language meaningfully through the process of planning, discussing, revising, and presenting project outcomes (Stoller, 2006). Research by Nguyen et al. (2022) also shows that PjBL can improve students' speaking skills, participation, and self-confidence because it provides more opportunities to communicate in English within authentic contexts. Therefore, integrating AI into PjBL has the potential to create a more

interactive, collaborative, and student-centered learning experience.

Although research on AI-assisted language learning, ELSA Speak, and Project-Based Learning has shown positive results, these studies generally still focus on the effectiveness of using AI or implementing PjBL separately (Aryanti & Santosa, 2024; Winduastuti et al., 2025; Bell, 2010; Nguyen et al., 2022). Research that specifically explores students' learning experiences with ELSA Speak as part of AI-assisted project-based learning, particularly in English language learning at the junior high school level, remains limited. Therefore, this study aims to explore students' learning experiences with ELSA Speak in AI-assisted project-based learning for speaking skills among junior high school students. This study focuses on students' experiences while using ELSA Speak in project-based learning, the benefits they perceive regarding the development of their speaking skills, and the challenges they face during the learning process. The findings of this study are expected to enrich the literature on the integration of AI in English language learning while

providing practical implications for teachers in designing more innovative and student-centered speaking instruction.

B. Research Methods

This study employs a qualitative approach to explore students' learning experiences in using ELSA Speak as part of the implementation of AI-Assisted Project-Based Learning in speaking instruction. This approach was chosen to gain an in-depth understanding of students' experiences and perceptions from their own perspectives within a natural learning context (Creswell & Poth, 2018).

The study was conducted at a junior high school in Karawang Regency, West Java, Indonesia. Instruction was delivered using Project-Based Learning (PjBL) through a project involving the creation of a procedure text vlog. During this process, students utilized ELSA Speak an Artificial Intelligence (AI)-based tool to practice pronunciation and speaking skills before recording their project videos. The study participants consisted of eight eighth-grade students selected

through purposive sampling, as all had participated in project-based learning and used ELSA Speak throughout the learning process, thereby enabling them to provide relevant information aligned with the study's objectives (Creswell & Poth, 2018).

Data were collected through semi-structured interviews. The interview guidelines were developed based on the research objectives and a review of the literature. This method was chosen because it provides researchers with the flexibility to explore participants' experiences in greater depth (Kallio et al., 2016). The interviews focused on students' experiences using ELSA Speak, the benefits they perceived, and the challenges they faced. All interviews were conducted in Indonesian, lasted approximately 15–20 minutes, were recorded with the participants' consent, and were then transcribed verbatim.

The data were analyzed using the interactive analysis model proposed by Miles, Huberman, and Saldaña (2014), which includes data condensation, data display, and conclusion drawing and verification. The data were first coded and grouped

into categories and themes, then interpreted to answer the research questions. To ensure the credibility of the findings, the researcher repeatedly reviewed the transcripts, coding results, and data interpretations and discussed them with the supervising professor. All participants voluntarily took part in the study, and their identities were anonymized using the codes S1-S8.

C. Result and Discussion

Positive Learning Experiences through AI-Assisted Project-Based Learning

The The interview results showed that all participants viewed the use of ELSA Speak as a positive learning experience during the AI-Assisted Project-Based Learning program. Most students described the learning process as fun, engaging, and more interactive than the speaking lessons they usually took. This made them more enthusiastic and motivated to actively participate in the learning process.

In addition to creating a positive learning experience, ELSA Speak also increased student engagement in speaking practice. All participants

stated that they practiced more frequently because the app provided features to listen to pronunciation examples, practice pronunciation, and repeat exercises until they achieved better results. These opportunities helped students prepare themselves before completing their project assignments.

Some students also noted that ELSA Speak supports more independent learning. Before recording their procedure text vlogs, they used the app to practice pronunciation, prepare dialogues, and ensure that the sentences they would deliver were pronounced correctly. The flexibility in practicing made the students feel more prepared when completing the project.

This experience is reflected in the following statement from S2.

"Perasaan saya senang karena Elsa memiliki pengajaran yang seru."
(S2)

S8 made a similar statement.

"Saya merasa senang dan lebih semangat untuk belajar speaking."
(S8)

Overall, these findings indicate that the use of ELSA Speak provides a positive learning experience,

increases student engagement in speaking practice, and supports self-directed learning during AI-Assisted Project-Based Learning.

Perceived Benefits for Speaking Development

The interview results show that all participants felt they benefited from using ELSA Speak to develop their speaking skills. The most frequently cited benefit was improved pronunciation. All students explained that the app helped them identify pronunciation errors, provided examples of correct pronunciation, and gave them the opportunity to correct their mistakes through repeated practice. This process helped students better understand how to pronounce English words correctly before using them in speaking projects.

In addition to helping improve pronunciation, ELSA Speak also has a positive impact on students' confidence when speaking English. Participants reported feeling more confident when delivering dialogues because they had practiced beforehand and received feedback on their pronunciation errors. Some

students even stated that the repeated practice helped improve their fluency in speaking.

This is reflected in S5's statement, who explained that ELSA Speak helped her improve her pronunciation through the pronunciation examples provided by the app.

"Aplikasi itu membantu pronunciation saya jadi lebih baik karena ada contoh pengucapan yang benar." (S5)

A similar experience was shared by S8, who noticed an improvement in their fluency after using ELSA Speak.

"Saya merasa speaking saya jadi lebih lancar dari sebelumnya." (S8)

In addition to supporting the development of speaking skills, all participants stated that ELSA Speak helped them prepare for their procedure text vlog assignments. Before recording, students used the app to practice reading the script, check their pronunciation, and ensure that the dialogue they were about to deliver was pronounced correctly. This preparation made them feel more ready and confident when recording their project videos. These findings

indicate that ELSA Speak not only serves as a tool for pronunciation practice but also acts as a supportive resource that helps students prepare for speaking assignments more effectively. ini

AI-Supported Learning Process

The interview results show that students appreciate the AI-powered learning process on ELSA Speak. Most participants stated that the feedback feature helps them identify and correct pronunciation errors in real time. When their pronunciation is incorrect, the app provides corrections and encourages students to repeat the pronunciation until they achieve better results.

In addition, students use ELSA Speak as a practice tool before recording their procedure text vlogs. They practice pronouncing words and sentences repeatedly so they feel more prepared when delivering the vlog content. The flexibility to practice as needed makes students more confident in completing their projects.

ELSA Speak also provides pronunciation examples that students can listen to before trying to say them themselves. According to the participants, the combination of

pronunciation examples and immediate feedback helps them learn more independently and purposefully.

S2 explained that the app provides immediate corrections when their pronunciation is not yet accurate.

"Saat kita salah dalam pronunciation, Elsa akan mengulangnya lagi." (S2)

S8 made a similar point, explaining that he listened to pronunciation examples before trying to speak and repeated the exercises.

"Saya mendengarkan contoh pengucapan lalu mencoba berbicara dan mengulang latihan." (S8)

Overall, these findings indicate that ELSA Speak supports the learning process through immediate feedback, repeated practice, and pronunciation examples, thereby helping students develop their speaking skills while encouraging self-directed learning during AI-Assisted Project-Based Learning.

Challenges Encountered by Students During the Use of ELSA Speak

The interview results show that although students responded positively to the use of ELSA Speak,

they also faced several challenges during the learning process. The most common challenge was adapting to the app in the early stages of use. Some students admitted they were still confused by the available features, but these difficulties diminished as they used the app more frequently. In addition, some participants complained about the limited features in the free version, which meant not all materials were accessible. Other challenges were related to technical issues, such as an unstable internet connection and difficulty understanding the feedback during the initial stages of use. However, students stated that these obstacles gradually diminished as they gained more experience using the app.

The students also noted that using ELSA Speak required extra time because they had to repeat the exercises several times before recording their procedure text vlogs. Nevertheless, they felt that the process helped improve their preparedness and speaking performance.

S7 explained that the main challenge arose when they first started using the app.

"Awalnya saya agak bingung, tapi lama-lama sudah mengerti." (S7)

A similar point was made by S6, who stated that the rehearsal took longer than the actual recording process.

"Membutuhkan waktu lebih lama untuk latihan dan merekam videonya." (S6)

Overall, these findings indicate that the challenges students faced were primarily related to the adaptation process and the technical aspects of using the app. Despite facing some obstacles, all participants still felt that the benefits of using ELSA Speak outweighed the challenges they encountered.

Discussion

Positive Learning Experiences through AI-Assisted Project-Based Learning

The research findings indicate that the integration of ELSA Speak into AI-Assisted Project-Based Learning provides a positive learning experience for students. Learning becomes more engaging and interactive, and encourages students to practice speaking more actively. The opportunity to learn independently

and receive immediate feedback makes students more engaged and better prepared to use English in speaking projects. Overall, these findings are consistent with previous research on AI-assisted language learning, which has highlighted its positive impact on students' learning experiences.

These findings align with Godwin-Jones (2021), who states that AI can create a more personalized learning experience through automated feedback and opportunities for independent learning. The results of this study also support Zou et al. (2023), who explain that the use of AI increases student motivation, engagement, and participation in English language learning. In this study, repeated practice helped students feel more prepared and confident when using English.

Furthermore, these findings align with the characteristics of Project-Based Learning. Bell (2010) states that PjBL encourages active student engagement through project completion, while Stoller (2006) explains that projects provide students with opportunities to use the target language in authentic contexts. Thus,

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the integration of ELSA Speak into PjBL not only supports speaking skills but also creates a more active, independent, and meaningful learning experience.

Perceived Benefits for Speaking Development

The research findings show that using ELSA Speak provides various benefits for the development of students' speaking skills. The most commonly reported benefits include improved pronunciation, fluency, self-confidence, and readiness to complete procedure text vlog assignments. These findings support previous studies on the positive contribution of AI-assisted language learning to students' speaking development.

These findings are consistent with those of Aryanti and Santosa (2024), who concluded that ELSA Speak is one of the AI-based apps effective in improving EFL learners' pronunciation skills through accurate and personalized feedback. The results of this study also support the findings of Alwin et al. (2024), who reported an improvement in pronunciation skills after students

used ELSA Speak. Furthermore, Ribhan et al. (2025) and Winduastuti et al. (2025) found that the use of this app not only improved speaking skills but also boosted students' motivation to learn and their self-confidence.

Interestingly, the benefits experienced by students in this study were not limited to linguistic development. ELSA Speak also serves as a preparation tool before students complete speaking projects. By using the app to practice pronunciation and dialogue before the recording process, students feel more prepared and confident when presenting the content of their procedure text vlogs. These findings are consistent with previous studies showing that AI can support students' speaking development while providing opportunities for independent practice and task preparation (Godwin-Jones, 2021; Bhar, 2026). This suggests that AI not only supports the improvement of speaking skills but also helps students prepare their performance in project-based tasks more effectively.

AI-Supported Learning Process

The research findings show that Artificial Intelligence (AI)-based

features in ELSA Speak, such as real-time feedback, pronunciation examples, and repetitive practice, help students identify and correct pronunciation errors on their own. This process makes learning not only dependent on teacher guidance but also supported by technology that provides immediate feedback on student performance.

These findings align with research by Xiao (2025), who states that technology based on Automatic Speech Recognition (ASR) is capable of providing immediate feedback, thereby making learning more interactive. Bhar (2026) also explains that AI provides students with the flexibility to learn according to their individual needs and learning pace. In this study, the opportunity to practice repeatedly helped students improve their speaking skills while preparing themselves before completing a project.

In addition, the use of AI supports self-directed learning in Project-Based Learning. While working on projects, students use ELSA Speak to independently assess and improve their speaking skills. These findings are consistent with

previous studies showing that the integration of AI into Project-Based Learning supports speaking development while promoting students' autonomy and engagement in the learning process (Bell, 2010; Bhar, 2026).

Challenges Encountered During AI-Assisted Project-Based Learning

Although ELSA Speak offers various benefits, this study also identified several challenges during its use, such as limited features in the free version, unstable internet connections, difficulty understanding feedback in the early stages, and the need for more practice time before recording a project. However, all participants stated that these challenges did not diminish the benefits they experienced during the learning process.

These findings suggest that the successful implementation of AI in language learning is influenced not only by the technology used but also by students' readiness to utilize that technology. These findings align with Godwin-Jones (2021), who states that the use of AI in language learning requires an adaptation process so that

students can make optimal use of the available features. Furthermore, Zou et al. (2023) also explain that the effectiveness of AI is influenced by how the technology is integrated into the learning process as well as student engagement during the learning process.

In the context of AI-Assisted Project-Based Learning, the results of this study indicate that the challenges faced by students are more technical than pedagogical in nature. These findings reinforce Bell's (2010) view that teachers continue to play a crucial role as facilitators who guide students throughout the learning process. Therefore, guidance during the initial stages of using the application, as well as support in the form of adequate facilities such as sufficient internet access, must be prioritized to ensure that the implementation of ELSA Speak can be optimized for speaking instruction in an EFL context.

D. Conclusion

The findings of this study indicate that the integration of ELSA Speak into AI-Assisted Project-Based Learning provides positive learning experiences for students in speaking

instruction. The use of AI-supported features, such as real-time feedback, pronunciation models, and repeated practice, helped students improve their pronunciation, speaking fluency, self-confidence, and readiness to complete the procedure text vlog project. Although students encountered several technical challenges, including limited features in the free version, unstable internet connections, and the need for additional practice time, they generally perceived that the benefits of using ELSA Speak outweighed the difficulties they experienced.

The findings imply that ELSA Speak can be considered a complementary learning tool to support speaking instruction in Project-Based Learning. English teachers may integrate AI-based applications to provide students with additional opportunities for independent practice and immediate feedback while maintaining the teacher's role as the facilitator of learning.

This study has limitations because it involved only eight participants from a single school and relied on interviews as the primary

data source. Therefore, future research is recommended to include a more diverse group of participants from various educational levels and to utilize a variety of data sources, such as classroom observations and analysis of project outcomes, in order to gain a more comprehensive understanding of the implementation of AI-Assisted Project-Based Learning in English language instruction.

BIBLIOGRAPHY

- Alwin, W. R., Manurung, K., Lebagi, D., & Mukrim. (2024). The use of English Language Speech Assistant (ELSA) Speak application to improve pronunciation. *Onoma: Education, Language, and Literature*, 10(3).
<https://doi.org/10.30605/onoma.v10i3.3926>
- Aryanti, R. D., & Santosa, M. H. (2024). A systematic review on artificial intelligence applications for enhancing EFL students' pronunciation skill. *The Art of Teaching English as a Foreign Language*, 5(1), 102–113.
<https://doi.org/10.36663/tatefl.v5i1.718>
- Aulia, L. G. Y. M., & Santosa, M. H. (2025). AI in language education: Systematic review of ELSA Speak's impact on English. *Jurnal Pendidikan Bahasa Inggris Indonesia*, 13(1).
<https://doi.org/10.23887/jpbi.v13i1.3771>
- Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House*, 83(2), 39–43.
<https://doi.org/10.1080/00098650903505415>
- Bhar, S. (2026). Artificial intelligence-mediated instruction for EFL speaking development: A systematic review. *Encyclopedia*, 6(4), Article 74.
<https://doi.org/10.3390/encyclopedia6040074>
- Brown, H. D. (2001). *Teaching by principles: An interactive approach to language pedagogy* (2nd ed.). Longman.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.
- Derakhshan, A., Kruk, M., Mehdizadeh, M., & Pawlak, M. (2020). Boredom in online classes in the Iranian EFL context: Sources and solutions. *System*, 89, 102215.
- Godwin-Jones, R. (2021). Emerging technologies: Artificial intelligence and language learning. *Language Learning & Technology*, 25(3), 5–14.
- Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: Developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing*, 72(12), 2954–2965.

- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE Publications.
- Nguyen, C. B., Nguyen, T. N., & Nguyen, T. X. M. (2022). Applying project-based learning to improve English speaking skills of remote learners at tertiary education. *Ho Chi Minh City Open University Journal of Science – Social Sciences*, 12(2), 89–104.
- Ribhan, A. A., Hadriana, & Safriyanti, M. (2025). A systematic literature review: The use of ELSA Speak on EFL students' speaking skill. *Jurnal PAJAR (Pendidikan dan Pengajaran)*, 9(4). <https://doi.org/10.33578/pjr.v9i4.127>
- Richards, J. C. (2008). *Teaching listening and speaking: From theory to practice*. Cambridge University Press.
- Stoller, F. L. (2006). Establishing a theoretical foundation for project-based learning in second and foreign language contexts. In G. H. Beckett & P. C. Miller (Eds.), *Project-based second and foreign language education: Past, present, and future* (pp. 19–40). Information Age Publishing.
- Thomas, J. W. (2000). *A review of research on project-based learning*. Autodesk Foundation.
- Tuan, N. H., & Mai, T. N. (2015). Factors affecting students' speaking performance at Le Thanh Hien High School. *Asian Journal of Educational Research*, 3(2), 8–23.
- Widyasari, P. (2023). The advantages of Artificial Intelligence ELSA Speak application for English learners: A literature review. *ELTT Conference Proceedings*.
- Winduastuti, N. K., Utami, I. G. A. L. P., & Artini, N. N. (2025). The integration of ELSA Speak on English pronunciation skills in EFL university students: A systematic literature review. *Edu Society: Jurnal Pendidikan, Ilmu Sosial, dan Pengabdian kepada Masyarakat*, 5(3), 2212–2221. <https://doi.org/10.56832/edu.v5i3.2534>
- Xiao, Y. (2025). The impact of AI-driven speech recognition on EFL listening comprehension, flow experience, and anxiety: A randomized controlled trial. *Humanities and Social Sciences Communications*, 12, 425. <https://doi.org/10.1057/s41599-025-04672-8>
- Yuliana, A. M. (2025). Using ELSA Speak for EFL student's pronunciation: A literature review. *PROJECT (Professional Journal of English Education)*, 8(3).
- Zou, B., Du, Y., & Li, C. (2023). An investigation into artificial intelligence speech evaluation programs with automatic feedback for EFL speaking. *SAGE Open*, 13(4). <https://doi.org/10.1177/21582440231217884>