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The Impact Of Ai-Assisted Digital Pedagogy On Efl Students' Speaking Self-Efficacy

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Abstract

The development of information and communication technology in recent years has driven the transformation of English as a Foreign Language (EFL) learning, particularly through the application of digital pedagogy. One of the latest innovations in digital pedagogy is the use of artificial intelligence (AI), wh=ich enables learning to be more personalized, adaptive, and less stressful. However, empirical studies that specifically examine the impact of AI-assisted digital pedagogy on the speaking self-efficacy of EFL students in higher education contexts are still limited. This study aims to examine the impact of AI-assisted digital pedagogy on the speaking self-efficacy of EFL students in the English Education Study Program, Faculty of Culture, Management, and Business, Mandalika University of Education. This study uses a quantitative approach with a one-group pre-test and post-test pre-experimental design. The research subjects consisted of 30 EFL students selected using purposive sampling. Data were collected through a speaking self-efficacy questionnaire adapted from Bandura's self-efficacy theory, then analyzed using descriptive statistics and a paired sample t-test. The results showed an increase in students' speaking self-efficacy after the implementation of AI-assisted digital pedagogy. The average speaking self-efficacy score increased from 68.40 on the pre-test to 82.73 on the post-test. The paired sample t-test results showed a significant difference between the pre-test and post-test scores ($t = 7.214$; $p < 0.05$). In addition, there was a shift in students' self-efficacy levels from the low and moderate categories to the high category. Based on these findings, it can be concluded that AI-assisted digital pedagogy has a positive and significant impact on improving the speaking self-efficacy of EFL students. The integration of AI in the learning is not only supports the development of speaking skills but also strengthens the affective aspects of students, particularly self-confidence, which plays an important role in successful oral communication

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1. INTRODUCTION

a. Latar Belakang

The development of information and communication technology in the last five years has driven significant transformation in the practice of teaching English as a foreign language (EFL), especially after the implementation of online learning during the pandemic. This transformation is not only related to the transfer of learning activities to digital platforms, but also requires the redesign of learning strategies to be more interactive, adaptive, and learner-centered. In the context of language education, the digital pedagogy approach is understood as a framework that integrates digital technology with effective pedagogical strategies to improve the quality of learning and student engagement (Kamarudin, 2025).

However, various recent findings show that the effectiveness of digital learning is not automatically achieved through the use of technology alone. The success of digital pedagogy

is greatly influenced by learning planning, institutional support, the pedagogical readiness of lecturers, and student-centered learning designs. In Indonesia, the acceleration of digital learning implementation during the pandemic emphasizes the urgency of educational transformation, but at the same time reveals various challenges, such as limited digital literacy, the quality of learning interactions, and the need for continuous pedagogical assistance (Kamarudin, 2025).

Research conducted by the author (Kamarudin, 2025) shows that digital pedagogy provides a number of benefits, including learning flexibility, access to more diverse learning resources, and increased opportunities for independent learning for students. However, the study also identified obstacles in the form of limited real-time interaction and technical problems that have the potential to hinder learning effectiveness. These findings emphasize that digital transformation in education needs to be designed comprehensively in order to continue to provide meaningful learning interactions and adequate learning support, rather than simply digitizing learning materials.

On the other hand, speaking skills are one of the most challenging aspects of EFL learning because they require immediate and spontaneous language performance. Many students experience obstacles such as fear of making mistakes, limited vocabulary, and communication anxiety. A collaborative study involving the author (Setianingsih et al., 2024) shows that self-efficacy has a very strong relationship with students' speaking ability ($R = 0.895$; $p = 0.000$). This finding confirms that students' self-confidence is a key factor that determines the quality of speaking performance, so that improving speaking skills is not only related to linguistic practice, but also to strengthening the affective-psychological aspects of students.

Furthermore, (Setianingsih et al., 2024) emphasize that students' self-efficacy in the context of speaking skills is greatly influenced by social persuasion factors (support, feedback, and encouragement) as well as emotional and physiological states (emotional conditions such as anxiety or comfort). Thus, students need a learning environment that is safe, supportive, and provides space to try without fear of negative judgment. Because speaking activities often trigger anxiety, learning that provides constructive feedback and a low-pressure atmosphere is very relevant in efforts to increase speaking self-efficacy.

In the context of Mandalika University of Education, the need to strengthen student learning support and motivation is also reflected in the author's previous research. Through the Basic English strengthening program, (Kamarudin & Imran, 2024) found that disparities in the quality of English language learning in various regions have an impact on student readiness in higher education. The program showed that structured learning interventions can improve students' language skills; however, the sustainability of these improvements is greatly influenced by students' motivation, perseverance, and self-confidence. These findings reinforce the importance of learning models that not only focus on cognitive-language aspects but also systematically build self-efficacy so that students are consistent in practicing.

In line with this, in the realm of professional communication, recent research involving the author shows a gap between theoretical learning and real communication practices that impacts students' confidence and communication skills (Muhlisin et al., 2023; Ngurah Rusmawan et al., 2025). Although the research was conducted in the context of tourism, its main message is relevant to EFL learning, namely that improving communication competence requires authentic practical experience, pedagogical support, and learning designs that approximate real-life situations. This reinforces the idea that speaking learning needs to provide an intensive, safe, and focused practice space.

Based on various findings in the last five years, the integration of AI-assisted digital pedagogy is a potential approach because artificial intelligence (AI) can provide more personalized, repetitive speaking exercises accompanied by quick feedback. These characteristics have the potential to strengthen students' self-efficacy in speaking English. However, studies that specifically examine the influence of AI-assisted digital pedagogy on

the speaking self-efficacy of EFL students in a university context, particularly in the environment of the Faculty of English Language and Literature at Mandalika University of Education, still require stronger empirical evidence. This is important considering that the author's previous research shows that the implementation of digital pedagogy is indeed effective in developing certain competencies, but it still requires appropriate interaction design and pedagogical support for optimal impact (Belda-Medina & Calvo-Ferrer, 2022; Kamarudin, 2025).

A number of recent studies also show that the use of AI-based digital pedagogy has a significant impact on the confidence of EFL students. AI-based tools, such as automatic speech evaluation systems and digital learning applications, have been proven to provide intuitive feedback and support the development of speaking skills (Nurmayasari, 2024; Qassrawi et al., 2024; Zou et al., 2023). Students who use these applications report improvements in fluency, pronunciation, and confidence in speaking English, in line with findings that AI technology can improve language learning outcomes (Kemelbekova et al., 2024). In addition, AI also contributes to creating a more positive learning atmosphere by increasing student engagement and reducing speaking anxiety (El Shazly, 2021; J. Huang, 2024; W. Huang et al., 2022; Lai, 1 C.E.; Zou et al., 2023).

Therefore, this study aims to examine the impact of AI-assisted digital pedagogy on the speaking self-efficacy of EFL students in the English Education Study Program, Faculty of Culture, Management, and Business, Mandalika University of Education. By placing self-efficacy as the main affective target, in addition to academic achievement, this study is expected to contribute to the development of a speaking learning model that is more relevant to student needs and in line with the demands of digital learning transformation in higher education.

2. RESEARCH METHODS

a. Research Design

This study used a quantitative approach with a one-group pre-test and post-test pre-experimental design. This design aimed to determine the effect of artificial intelligence (AI)-assisted digital pedagogy on the speaking self-efficacy of EFL students. The research was conducted at the Faculty of Culture, Management, and Business, Mandalika University of Education, English Education Study Program. The research subjects consisted of 30 students selected using purposive sampling.

b. Research Procedure

The research procedure was carried out through several stages as follows:

1. Preparation

In this stage, the researcher developed AI-assisted digital pedagogy-based learning tools, including selecting the AI platform used in speaking learning. In addition, the researcher prepared research instruments in the form of a speaking self-efficacy questionnaire and validated the content of the instruments based on self-efficacy theory.

2. Pre-test

Before the treatment was administered, students were given a pre-test in the form of a questionnaire on self-efficacy in speaking English to determine their level of confidence in speaking English before the implementation of AI-assisted digital pedagogy.

3. Treatment Phase

The treatment was administered through the application of AI-assisted digital pedagogy in speaking lessons over several sessions. At this stage, students were involved in speaking practice activities using AI-based media, such as AI chatbots and speaking feedback applications. Students were given the opportunity to practice independently, receive immediate feedback, and repeat the exercises as needed.

4. Post-test

After the entire treatment series was completed, students were given a post-test using the

same speaking self-efficacy questionnaire as the pre-test. This stage aimed to determine changes in students' speaking self-efficacy levels after participating in AI-based learning.

5. Data Processing

The pre-test and post-test data were collected, tabulated, and analyzed to determine the differences and effects of AI-assisted digital pedagogy on the speaking self-efficacy of EFL students.

c. Data Analysis Techniques

The data obtained was analyzed using descriptive statistics and inferential statistics. Descriptive statistics were used to determine the mean value of students' speaking self-efficacy before and after the treatment. Furthermore, to determine the significant difference between the pre-test and post-test scores, a paired sample t-test was used.

The test was conducted at a significance level of 0.05. If the Sig. (2-tailed) value was < 0.05, it could be concluded that there was a significant difference between the students' speaking self-efficacy before and after the application of AI-assisted digital pedagogy.

d. Research Instrument

The research instrument used in this study was a speaking self-efficacy questionnaire adapted from Bandura's self-efficacy theory (Bandura, 2000). The questionnaire consisted of 10 statements that measured students' confidence in their English speaking abilities, such as confidence in expressing opinions, courage to speak in public, and ability to overcome speaking anxiety.

Each statement was compiled using a five-point Likert scale, namely strongly disagree, disagree, undecided, agree, and strongly agree. The questionnaire was administered twice, namely at the pre-test and post-test, to determine changes in students' speaking self-efficacy after the implementation of AI-assisted digital pedagogy.

3. RESEARCH RESULTS AND DISCUSSION

a. Results

The analysis of the research results focused on changes in students' speaking self-efficacy levels before and after the implementation of AI-assisted digital pedagogy. Data were obtained from 30 respondents through a speaking self-efficacy questionnaire and analyzed using descriptive statistics and a *paired sample t-test*.

1) Descriptive Statistics of Speaking Self-Efficacy Scores

Descriptive statistics were used to determine the general description of students' speaking self-efficacy levels before and after the treatment. The results of the descriptive statistical analysis are presented in Table 1.

Table 1. Descriptive Statistics of Students' Speaking Self-Efficacy Scores

Test	N	Minimum Score	Maximum Score	Mean	Standard Deviation
Pre-test	30	55	78	68.40	6.21
Post-test	30	70	95	82.73	5.84

Based on Table 1, the students' pre-test speaking self-efficacy scores indicate that most students are in the moderate category. The pre-test mean score is 68.40 with a standard deviation of 6.21, indicating variation in speaking confidence levels among students.

After the implementation of AI-assisted digital pedagogy, students' speaking self-efficacy scores increased significantly. The post-test average score increased to 82.73 with a standard deviation of 5.84. The decrease in the standard deviation value indicates that students' speaking self-efficacy levels became more evenly distributed after the treatment, meaning that most students experienced an increase in speaking confidence.

2) Distribution of Students' Speaking Self-Efficacy Levels

To provide a more detailed picture, students' speaking self-efficacy scores were grouped into three categories: low, medium, and high. The distribution of categories is presented in Table 2.

Table 2. Distribution of Students' Speaking Self-Efficacy Levels

Category	Score Range	Pre-test (f)	Pre-test (%)	Post-test (f)	Post-test (%)
Low	≤ 60	8	26.7	1	3.3
Moderate	61–80	17	56.6	9	30.0
High	≥ 81	5	16.7	20	66.7
Total		30	100	30	100

Based on Table 2, in the pre-test stage, most students were in the moderate category (56.6%), and there were still students in the low speaking self-efficacy category (26.7%). After the implementation of AI-assisted digital pedagogy, there was a significant shift in categories, in where the majority of students were in the high category (66.7%), and there were almost no students in the low category.

This change in distribution shows that AI-assisted digital pedagogy not only increased the average speaking self-efficacy score but also encouraged most students to move to a higher level of speaking confidence.

3) Results of the Paired Sample t-Test

A *paired sample t-test* was conducted to determine the significant difference between students' speaking self-efficacy scores before and after the treatment. The test results are presented in Table 4.

Table 4. Results of the Paired Sample t-Test for Speaking Self-Efficacy

Variable	Mean Pre-test	Mean Post-test	gain	t-test	Sig. (2-tailed)
Speaking Self-Efficacy	68.40	82.73	14.33	7.214	0

The results of *the paired sample t-test* show a t-test of 7.214 with a significance value of 0.000 (< 0.05). This indicates that there is a significant difference between the speaking self-efficacy scores of students before and after the implementation of AI-assisted digital pedagogy.

Overall, the statistical analysis results show that the application of AI-assisted digital pedagogy has a significant impact on improving EFL students' speaking self-efficacy. This improvement is not only reflected in the average speaking self-efficacy score but also seen in the shift in the distribution of students' self-efficacy levels from the low and moderate categories to the high category. These findings indicate that AI-based learning contributes not only to quantitative improvements in scores but also to a more equitable strengthening of students' self-confidence. Therefore, the results of this study need to be discussed further in relation to self-efficacy theory and recent empirical findings to understand the pedagogical mechanisms that enable AI-assisted digital pedagogy to increase students' confidence in speaking English.

b. Discussion

The results of this study indicate that the application of AI-assisted digital pedagogy has a significant positive impact on improving the speaking self-efficacy of EFL students. This increase in self-efficacy scores indicates that students feel more confident, comfortable, and courageous in using spoken English after participating in AI-based learning.

This finding is in line with the research by (Zou et al., 2023), which states that AI-based

technology can create a more personalized and adaptive learning environment, thereby helping language learners develop confidence in their speaking skills. AI allows students to practice speaking repeatedly without social pressure, which can ultimately reduce language anxiety.

Furthermore, (Zou et al., 2023) emphasize that the use of AI chatbots in foreign language learning contributes to improving learners' affective aspects, including motivation and self-efficacy. The immediate feedback and independent practice opportunities provided by AI allow students to monitor the gradual development of their speaking skills.

The results of this study also support the findings of (Istikharoh & Utami, 2024), who reported that digital technology-based learning can increase students' self-efficacy because it provides a more flexible learning experience and supports independent learning. In the context of speaking learning, this flexibility is very important because students can adjust the speed and intensity of practice according to their needs.

From the perspective of Bandura's self-efficacy theory, the increase in students' speaking self-efficacy in this study can be explained through mastery experiences and reduced emotional states (Bandura, 2000). AI-assisted digital pedagogy provides a positive and anxiety-free learning experience, making students more confident in their speaking abilities. Similar findings were also reported by (Puja, 2024), who stated that technology-based learning environments can increase language learners' confidence by reducing their fear of making mistakes.

Thus, the results of this study reinforce the view that AI-assisted digital pedagogy not only contributes to the improvement of technical speaking skills but also plays an important role in strengthening students' affective aspects, particularly speaking self-efficacy. This is important for EFL learning in higher education, where student confidence is often a determining factor in the success of oral communication.

4. CONCLUSIONS

Based on the research results and discussion, it can be concluded that the application of AI-assisted digital pedagogy has a positive and significant impact on improving the speaking self-efficacy of EFL students in the English Education Study Program, Faculty of Culture, Management, and Business, Mandalika University of Education. This is evidenced by an increase in the average speaking self-efficacy scores of students, a shift in the distribution of self-efficacy categories from low and moderate to high, and the results of the paired sample t-test, which show a significant difference between the pre-test and post-test scores.

This increase in speaking self-efficacy shows that AI-based learning can create a learning environment that is safer, more flexible, and supports students' affective aspects. Through the use of AI, students have the opportunity to practice speaking independently, receive immediate feedback, and reduce anxiety in using English. These conditions encourage students to be more confident and active in speaking activities.

Thus, AI-assisted digital pedagogy not only contributes to improving technical speaking skills but also plays an important role in strengthening students' self-confidence as an affective factor that determines the success of EFL learning. Therefore, the integration of AI in speaking learning is recommended as an alternative learning strategy in higher education, especially in efforts to increase self-efficacy and active participation of EFL students.

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