# Artificial Intelligent Supported Duolingo: Enhancing Students' Speaking Skills and Reducing Speaking Anxiety in Vocational Education

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**ABSTRACT**

The integration of artificial intelligence (AI) into language education has introduced adaptive, interactive learning experiences that enhance student engagement, particularly in English language instruction. For vocational students, strong communication skills are essential alongside technical competencies. However, challenges such as limited speaking exposure, low self-confidence, and high anxiety persist, often intensified by traditional grammar-focused teaching methods. This study investigates the effectiveness of AI-supported Duolingo in enhancing speaking skills and reducing speaking anxiety among 64 students at SMKN 1 Kunduran, a vocational high school in Indonesia. Utilizing a mixed-methods approach, quantitative data were analyzed using ANOVA and ANCOVA, while qualitative insights were gathered through student interviews and analyzed via MAXQDA. Results show that Duolingo significantly improved students' speaking skills such as their vocabulary, pronunciation, and fluency, with the experimental group consistently outperforming the control group. The platform's AI-driven speech recognition and instant feedback mechanisms fostered a low-anxiety environment, increasing learners' speaking confidence. Student perceptions further highlighted Duolingo's ease of use, engaging gamification, and collaborative learning benefits. Nevertheless, the study reinforces the importance of real-life speaking interactions to achieve comprehensive fluency.

**Keywords:** Artificial intelligent-supported Duolingo; speaking skills; speaking anxiety

## INTRODUCTION

Technological innovation improves teaching and learning by making it more effective and engaging. It also gives organizations a competitive edge (Benaouag & Kharchi, 2024) Technology helps students take an active role in learning by allowing them to personalize their English learning based on their needs and interests. English has become more important due to globalization and is widely seen as the international language of business and communication (Yu & Wan Mohammad, 2019) . In recent years, many countries have created policies to support science and technology education, especially in digital skills like computational thinking and artificial intelligence (Hsu & Chen, 2022). These efforts aim to improve access to educational technology and support cross-

cultural learning, making language learning richer and more meaningful.

Integrating artificial intelligence (AI) with modern teaching tools helps students connect new knowledge with their existing understanding, improving comprehension (Mohammed & Kinyó, 2022). The cognitive comprehension disparities between learners with different levels of English proficiency and their capacity to compete in a global setting can be reflected in this digital English vocabulary game (Wang et al., 2022) . This encompasses several disorders that impact a person's cognitive function, memory, or recollection of knowledge (Adebesin & Pillay, 2022). Gaining proficiency in speaking has several benefits, such as more chances for education and work abroad. As expressed by Katyeudo &de Souza (2022) Educational systems must adapt to deliver students with the skills necessary to build a more just and productive world for society.

As children's vocabulary and grammar improve, they are better able to speak appropriately in different social situations and understand other people's views. These skills are important for effective communication (Alduais et al., 2022). These obstacles are often shaped by teachers' perceptions of their students' future needs for English language proficiency (Li, 2025). Given that language plays a crucial role in both educational and professional contexts, fostering speaking competence is essential for enabling meaningful communication. As stated by Q. Huang (2012) learning a foreign language naturally causes learners to experience a variety of communicative modifications.

Many previous studies have looked into the same topic. Web-Based Language Learning and Speaking Anxiety by Bashori et al (2022) . The study's conclusions showed that students had moderate to severe levels of Foreign Language Speaking Anxiety (FLSA), thought web-based language learning may assist them with their speaking anxiety, and gave the learning websites favorable reviews. These findings provide credence to the use of educational technology in language instruction, especially when it comes to situations when students might gain from mobile-assisted learning resources. Another prior study is The Effects of Voice-based AI Chatbots on Korean EFL Middle School Students' Speaking Competence and Affective Domains by Han (2020). The Results show that EFL students' speaking abilities were significantly enhanced by the AI chatbot. According to the study results, students' perceptions of AI chatbot-assisted English learning improved with time. It is more likely for an invention to spread quickly if it is incongruent with preexisting beliefs and experiences (Andersen, 2022) .

The growing affordability of digital technologies has increased access to language-learning applications (Mohammed & Kinyó, 2022). However, there are unique difficulties in learning English as a second language, and one of the most common obstacles for students is anxiousness. Research on second language acquisition has looked closely at emotional elements, especially anxiety, because they may either help or hinder the learning process. (Tsiriotakis et al., 2017). The standard definition of foreign language anxiety is a negative emotional response to language acquisition that frequently

prevents pupils from speaking with confidence. Since these anxiety-related issues can seriously hamper learners' development of speaking competency, it is imperative that they be effectively addressed (Alamer & Almulhim, 2021).

As artificial intelligence (AI) becomes more important in education, researchers have explored various strategies to reduce language anxiety and improve speaking skills. Advances in digital technologies, especially information and communication technology (ICT), are transforming communication, business, and education in today's connected world. (Cascio & Montealegre, 2016). Vocational high school English instruction requires specialized teaching methods that blend pertinent subject information with experiential, hands-on learning techniques (Muliyah & Aminatun, 2020). The growing popularity of smartphone apps, particularly those that employ AI-based voice recognition, presents encouraging chances for students to improve their speaking abilities.

Science has shown how beneficial the game-like learning platform Duolingo is for helping students improve their speaking skills (Fitria et al., 2023) . Duolingo is a language-learning tool that supports speaking skill development through interactive, gamified, and AI-based activities. This suggests that mobile technology can help students continue learning English in comfortable settings outside of the classroom, such vocational high schools (Chien et al., 2022). Duolingo is a modern digital platform with a user-friendly design that supports efficient English practice. Its AI-powered voice recognition provides instant feedback, helping students improve grammar, pronunciation, and fluency over time.

Although research on language learning is growing, especially in vocational education, the use of AI-supported apps like Duolingo to improve speaking skills and reduce anxiety has received little attention. Most previous studies focused on vocabulary or overall language skills, often ignoring the emotional challenges students face when speaking. As AI continues to develop in education, more attention is being given to how it can support foreign language learning (Silitonga et al., 2023). Research on the effectiveness of AI technologies in education is still ongoing, while motivating students in foreign language learning remains a crucial and challenging task (Tan et al., 2025). Technology-enhanced learning activities help close the gap between classroom instruction and real-world conversation, which makes learning English more fun, interesting, and less stressful (Y. M. Huang et al., 2022).

The significance gap of this research is speaking skills are essential in vocational education. In addition to technical training, these students also learn speaking skills needed for presentations, interviews, and other professional situations. However, speaking is often the most difficult skill to develop, especially for those who experience anxiety or lack confidence. An empirical analysis of the screenshot function is necessary given the possible deterioration in speaking abilities that coincides with the development of digital communication (Ingber, 2025).This research is important

because it addresses the gap in supporting both the emotional and practical aspects of speaking. By exploring the use of AI-supported tools to reduce speaking anxiety and improve speaking skills, the study offers valuable insights into the effective use of technology in vocational language learning. It also promotes learner-centered approaches that help students gain the confidence to use English in real-life situations.

As stated by Guan et al., (2025) through its many features, students may gain a great deal by integrating AI-powered Duolingo into EFL instruction in a comprehensive manner that takes into account both its technology and significant effect. It includes various tools that make language learning more enjoyable and interactive. By using Duolingo before class, students can learn at their own pace and better prepare for more complex, problem-solving tasks during in-person lessons (Silitonga et al., 2024). Duolingo is well-suited for high school or vocational students, especially beginners, due to its combination of text, audio, and visual features. This study explores how the AI-powered Duolingo app can improve students' speaking skills and reduce their speaking anxiety. It focuses on how AI tools support speaking confidence, fluency, vocabulary, and pronunciation. The findings will offer useful insights for educators and researchers seeking to enhance English-speaking instruction through technology.

This study focuses on three research questions. First, it examines how AI-supported Duolingo affects vocational high school students' speaking skills, including pronunciation, vocabulary, fluency, and overall language ability. Second, it investigates whether Duolingo's speech recognition and interactive exercises reduce students' speaking anxiety and build their confidence. Third, it explores students' experiences using AI-supported Duolingo in cooperative learning, focusing on the platform's interface, gamification, and interactive features. By answering these questions, the study aims to provide useful insights into how AI can improve English learning and offer practical guidance for its use in vocational education.

**METHOD**

This study used a mixed-methods approach to examine the impact of the AI-powered Duolingo program on improving students' speaking skills and reducing speaking anxiety. Mixed-methods research combines both quantitative and qualitative methods to provide a more complete and detailed understanding of the topic (Saraswati & Devi, 2023). By integrating the strengths of both approaches, mixed-methods research seeks to offer a comprehensive understanding of the phenomenon under investigation.
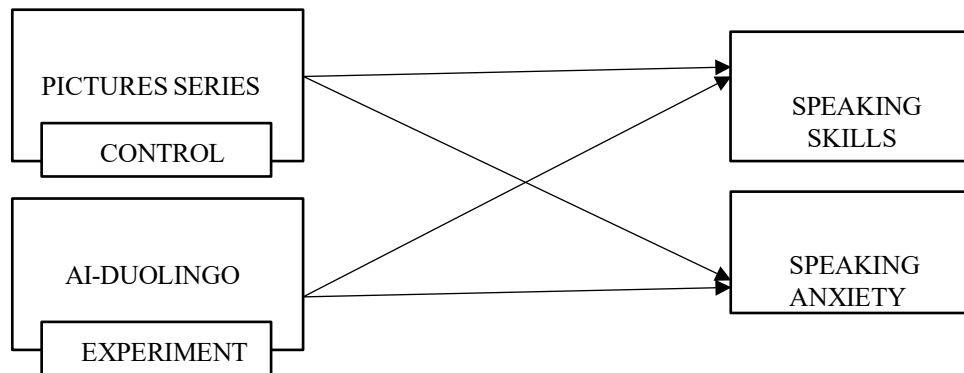
**Figure 1.** Research Design

Figure 1 illustrates the structure of the quasi-experimental design used in this study. The design involved two groups—an experimental group and a control group—with pre-tests, treatments, and post-tests. A mixed-method approach collected qualitative data through interviews and quantitative data through questionnaires. The students' average scores from the tests were used to analyze post-test results. Variables were manipulated in the experimental group to observe their effects on other variables (Rahi, 2017). The researcher conducted daily speaking assessments in the experimental group using an intervention that combined cooperative learning with AI-powered Duolingo. Meanwhile, the control group received traditional teaching with picture series supported by cooperative learning. These picture series acted as visual prompts to help students improve speaking by describing scenes, sequencing events, and creating stories. This method encouraged creativity and verbal expression without technology. While it provided structured practice in vocabulary, grammar, and fluency, it lacked the interactive and adaptive features of the AI-supported Duolingo used by the experimental group. As stated by Fadillia (2022) a picture series helps students recognize and compare words with real objects, clearly see the image, and imagine what to say, making it easier for them to speak.

This study involved tenth-grade students from SMKN 1 Kunduran-Blora. Two classes were randomly selected as the control and experimental groups to ensure fair representation. Each group had 32 students who needed to improve their speaking skills and reduce speaking anxiety, making them suitable participants for this research. Participation was voluntary, and students were informed about the study's purpose and could choose to join freely, ensuring ethical standards. The control group received traditional teaching using picture series, while the experimental group used the AI-powered Duolingo app combined with cooperative learning. The study focused on two main variables: students' speaking skills and speaking anxiety, with clear objectives to guide the research.

Figure 2 illustrates the research process. The study consisted of seven class sessions: two sessions were used for pre-test and post-test questionnaires, and five sessions involved the Duolingo-based intervention. At the first session, a pre-test measured students' speaking anxiety levels before the

intervention. Only the experimental group received the AI-powered Duolingo treatment to improve fluency and reduce anxiety, while the control group used traditional teaching methods. Both groups took speaking assessments at the end of each session to monitor progress. After the treatment, a post-test questionnaire measured changes in anxiety levels. Finally, interviews were conducted with five students from the experimental group to collect qualitative data on their speaking anxiety. Questions for semi-structured interviews were adapted from (Weller et al., 2018).
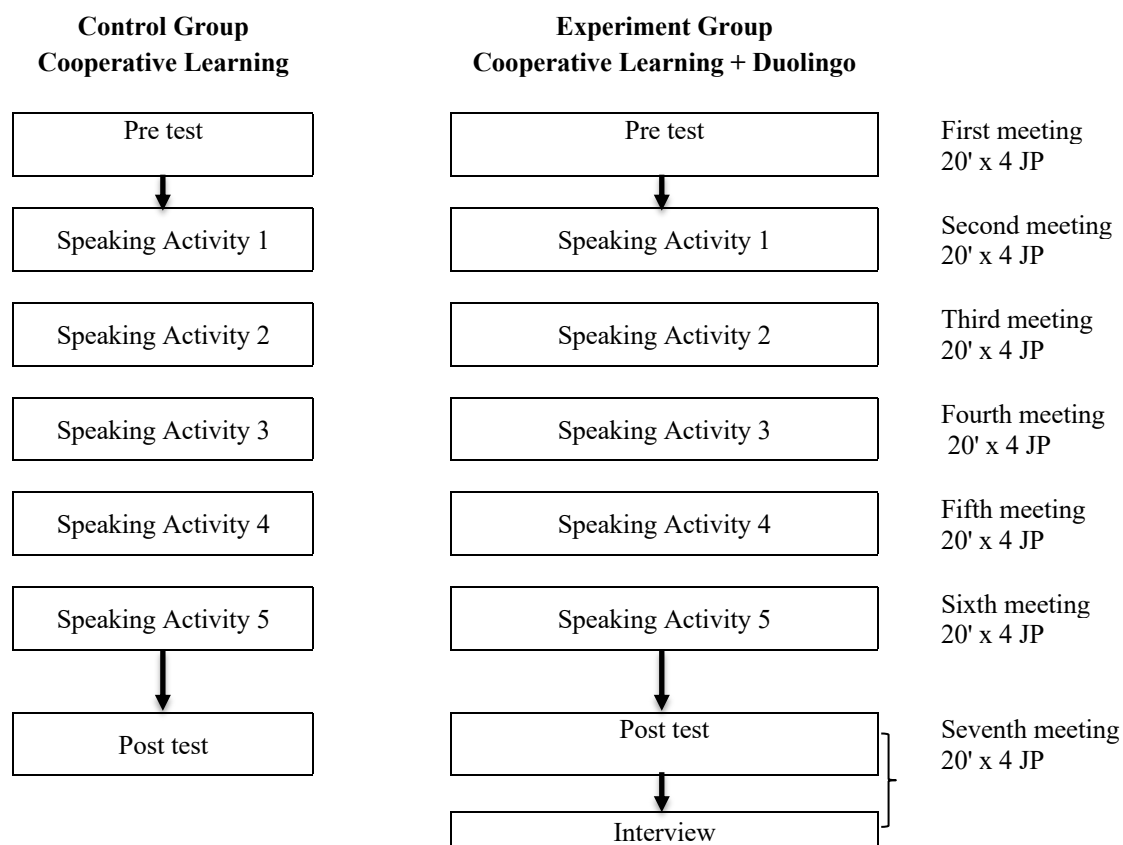


**Figure 2.** Experiment Procedure

The researcher delivered a pretest and post-test using questionnaires in two of the seven class meetings which modified from Horwitz et al., (1986) and Duolingo-based therapy in the other five. The AI-Duolingo intervention has the following structure:

Table 1. AI-Duolingo Intervention Structure

| Meeting | Time allocation | Experiment Class Activities |
|---|---|---|
| 1st meeting | 80 minutes | ❖ Pretest<br>❖ Introduce Duolingo application.<br>❖ Download Duolingo application. |
| 2nd Meeting | 80 minutes | ❖ Open the material link, self-introductions.<br>❖ Explains the material.<br>❖ Use Duolingo app in cooperative learning to complete Using Basic Sentences.<br>❖ Practice introducing themselves to each other in pairs for a one-minute recording. |

| Meeting | Time allocation | Experiment Class Activities |
|---|---|---|
| | | ❖ Assessment and evaluates common error. |
| 3rd Meeting | 80 minutes | ❖ Questions related to the material (Describing Person in The School). <br> ❖ Explain the material. <br> ❖ Ask questions related to the material in cooperative learning. <br> ❖ Instructs the students to use their Duolingo app to complete it. <br> ❖ Have cooperative practicing to give a brief explanation about person in the school, which will be recorded in a 1-minute. <br> ❖ Assessment and evaluates common error. |
| 4th Meeting | 80 minutes | ❖ Questions related to the material (Introducing Family). <br> ❖ Explains the material. <br> ❖ Practice repeating English sounds using their Duolingo app. <br> ❖ Have cooperative learning to select one word or sentence from the Duolingo app and explain it using their own sentences in a 1-minute recording. <br> ❖ Assessment and evaluates common error. |
| 5th Meeting | 80 minutes | ❖ Questions related to the material (Describing Family). <br> ❖ Explains the material. <br> ❖ Practice repeating English sounds using their Duolingo app. <br> ❖ Have cooperative learning to select one word or sentence from the Duolingo app and explain it using their own sentences in a 1-minute recording. <br> ❖ Assessment and evaluates common error. |
| 6th Meeting | 80 minutes | ❖ Questions related to the material (Things at Home). <br> ❖ Explains the material. <br> ❖ Practice repeating English sounds using their Duolingo app. <br> ❖ Have cooperative learning to select one word or sentence from the Duolingo app and explain it using their own sentences in a 1-minute recording. |
| 7th Meeting | 80 minutes | ❖ Determine if it helps reduce their anxiety by giving questionnaire. <br> ❖ Asks five students to participate in an interview session to assess their perceptions of using Duolingo and conduct an evaluation. |

Analysis of Covariance (ANCOVA) was used to analyze the quantitative data. The Shapiro-Wilk test checked if the data were normally distributed, with a significance level of $p > 0.05$. Both the experimental and control groups showed normal distribution, with p-values of 0.554 and 0.088, respectively. Levene's test was used to assess the homogeneity of variances for speaking anxiety, confirming that the variances were equal ($F = 0.638$, $p = 0.592$). These results support the use of one-way ANCOVA and meet its assumptions.

The average scores from the speaking tests conducted in each session served as quantitative data to assess students' speaking abilities. These tests were evaluated using a rubric adapted from Douglass Brown (2004), as shown in Table 2, to measure speaking proficiency. The data were analyzed using ANOVA. The rubric evaluated five key aspects of speaking: pronunciation, grammar, vocabulary, comprehension, and fluency. It assessed students' speaking skills on various topics, such as introducing themselves, describing a person, presenting family members, describing the family, and identifying household objects.

**Table 2.** Scoring Rubric Adapted from Douglass Brown

| Score | Grammar | Vocabulary | Comprehension | Fluency | Pronunciation |
|---|---|---|---|---|---|
| 1 | Grammar errors are frequent. | Speaking vocabulary inadequate to express anything but the most elementary needs. | Can understand simple questions and statements if delivered with slowed speech, repetition, or paraphrasing. | No specific fluency description. | Errors in pronunciation are frequent. |
| 2 | Can usually handle elementary constructions quite accurately but does not take confident control of grammar. | Has speaking vocabulary sufficient to express himself simply. | Can get the gist of most conversations. | Can handle with confidence but not with facility most social situations. | Accent is intelligible through often quite faulty. |
| 3 | Control of grammar is good. | Vocabulary is broad enough that he rarely has to grope for a word. | Comprehension is quite complete at a normal rate of speech. | Can discuss particular interests of competence with reasonable ease. | Accent may be obviously foreign. |
| 4 | Grammar errors are quite rare. | Can understand and participate in any conversation. | Can understand any conversation. | Able to use the language fluently. | Errors in pronunciation are quite rare. |
| 5 | Equivalent to that of an educated native speaker. | Speech on all levels is fully accepted by educated native speakers. | Equivalent to that of an educated native speaker. | Has complete fluency in the language. | Equivalent to that of an educated native speaker. |

Brown's speaking assessment instrument was validated in three main ways. First, content validity ensures it covers five key speaking skills—grammar, vocabulary, comprehension, fluency, and pronunciation—following international standards like CEFR, making it suitable for vocational students. Second, construct validity shows that each skill is related but distinct, with expert reviews confirming the levels match different proficiency stages. Third, face validity means the tool is clear and easy to use, with score descriptions that help assessors evaluate students fairly and consistently.

Both the experimental and control groups were given a questionnaire as part of the data collecting and analysis process. A questionnaire intended to gauge students' anxiety levels toward learning English was used for both pre- and post-tests. The 32 anxiety-related items in the test were taken from Horwitz et al. (1986). Five members of the experimental group were also interviewed in order to collect qualitative data. With the participants' permission, the researcher conducted each interview, recorded it, and wrote up the transcription. To maintain secrecy, the transcripts were safely kept in a secured file that only the researcher could access. The interview questions were adapted from

Weller (2018). Qualitative data analysis was carried out using MAXQDA software. The use of selected English learning materials was allowed during the activities. This method aimed to provide data on how using AI-supported Duolingo within cooperative learning affects students' speaking skills and anxiety. The results offer useful insights for educators and researchers who want to improve speaking instruction with technology.

## RESULTS & DISCUSSION

### *Results*

Validity and reliability tests were carried out to confirm that the research instrument or measurement tool effectively assessed its intended constructs while ensuring consistency in the data obtained. Adapted from Brown (2004), the rubric was employed to evaluate students' speaking skills. The validity and reliability results are presented in Table 3.

**Table 3.** Results of the validity and reliability tests

| Variables | Dimensions | Validity | Reliability |
|---|---|---|---|
| Speaking Anxiety | | .294 | .716 |
| Speaking skills | Introducing Self | .813 | .901 |
| | Describing Person | .914 | .857 |
| | Introducing Family | .914 | .857 |
| | Describing Family | .934 | .853 |
| | Things At Home | .704 | .940 |

P < 0.05

The r-table value for the validity test, with a sample size of 32 and a significance level of 5%, was 0.2869. Since the calculated R-value exceeded the R-table value, the instrument was considered valid. This conclusion was further supported by a significance value ($p < 0.05$). Regarding the reliability test, the instrument was deemed reliable as the Cronbach's Alpha coefficient exceeded 0.60, as presented in the table.

### *Quantitative Approach (Comparison Analysis)*

An ANOVA test was conducted to assess the effect of the AI-supported Duolingo cooperative application on students' speaking skills. The instructional content included topics such as self-introduction, describing a person at school, family members, and household items. This analysis aimed to determine whether there was a statistically significant difference in post-test speaking performance between the experimental and control groups. The results of the data analysis are presented as follows:

**Table 4.** Descriptive results for speaking skills

| Variable | Control | | | Experimental | | |
|---|---|---|---|---|---|---|
| | Sum | Mean | SD | Sum | Mean | SD |
| Introducing Self | 1884 | 58.88 | 3.405 | 1896 | 59.25 | 3.992 |
| Describing Person | 2004 | 62.63 | 3.309 | 2076 | 64.88 | 3.480 |
| Introducing Family | 2128 | 66.50 | 3.172 | 2204 | 68.88 | 3.480 |
| Describing Family | 2256 | 70.50 | 3.172 | 2344 | 73.25 | 3.860 |
| Things At Home | 2368 | 74.00 | 2.688 | 2540 | 79.37 | 4.203 |
| Average | 2128 | 66.50 | 3.059 | 2212 | 69.13 | 3.210 |

**Table 5.** ANOVA results for speaking skills

| Variable | SS | df | Mean Square | F | p |
|---|---|---|---|---|---|
| Introducing self | 2.250 | 1 | 2.250 | .163 | .687 |
| Describing person | 81.000 | 1 | 81.000 | 7.024 | .010 |
| Introducing family | 90.250 | 1 | 90.250 | 8.139 | .006 |
| Describing Family | 121.000 | 1 | 121.000 | 9.693 | .003 |
| Things at Home | 462.250 | 1 | 462.250 | 37.148 | .000 |
| Average 5 sessions | 110.250 | 1 | 110.250 | 11.215 | .001 |

$P < 0.05$.

Table 4 shows the mean scores for each session, indicating improvement in both the experimental and control groups. In the first session on self-introduction, the experimental group scored slightly higher (M = 59.25) than the control group (M = 58.88), but the difference was not statistically significant (p = 0.687). In the following sessions, the experimental group consistently outperformed the control group, with mean scores of M = 69.15 and M = 66.50, respectively. The ANOVA test showed a significant difference between groups (p = 0.001), confirming the experimental group's better performance. Additionally, a questionnaire measured students' speaking anxiety before and after the intervention to evaluate changes in anxiety levels.

**Table 6.** Descriptive results for speaking anxiety

| Variable | Control | | | | | | Experimental | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pretest | | | Post test | | | Pretest | | | Post test | | |
| | Mean Statistic | Mean Std. Eror | SD | Mean Statistic | Mean Std. Eror | SD | Mean Statistic | Mean Std. Eror | SD | Mean Statistic | Mean Std. Eror | SD |
| Speaking Anxiety | 105.28 | 1.470 | 8.313 | 86.91 | 1.681 | 9.512 | 108.56 | 1.657 | 9.374 | 111.34 | 1.766 | 9.992 |

**Table 7.** ANCOVA results for speaking anxiety

| Variable | SS | df | Mean Square | F | p | Partial $\eta^2$ |
|---|---|---|---|---|---|---|
| Speaking Anxiety | 7982.733 | 1 | 7982.733 | 106.326 | .000 | .635 |

$P < 0.05$.

Speaking anxiety greatly affects students' ability to communicate orally and their overall language learning. This study used ANCOVA to compare speaking anxiety levels between the experimental and

control groups after the intervention, controlling for initial anxiety differences. Results in Table 7 show a significant reduction in anxiety for the experimental group (F = 106.326, p < 0.05, $\eta^2$ = 0.635), indicating that the AI-supported Duolingo with cooperative learning effectively lowered students' speaking fear. Table 6 also shows that the experimental group had higher speaking scores (M = 111.34) and greater anxiety reduction than the control group (M = 86.91). The N-gain test further supports these findings, with the experimental group scoring 0.7620 (very high, 76.20% effective) compared to the control group's 0.5460 (moderate, 54.60% fairly effective). Overall, learning in the experimental class was more effective.

**Table 8.** N-Gain test result

| Variable | Experiment | Control |
|---|---|---|
| N-Gain Score | .7620 | .5460 |
| N-Gain Persen | 76.20 | 54.60 |

The significant decrease in anxiety in the experimental group shows that using AI technology like Duolingo creates a low-pressure environment where learners can practice speaking at their own pace. The interactive and gamified features of the AI-supported app likely boosted students' confidence and motivation, helping to reduce their fear of making mistakes. These results highlight the potential of AI tools to improve both students' speaking skills and their emotional comfort when learning English as a foreign language.

### Qualitative Approach (Interview)

Through student interviews, the researcher gained insights into their perceptions of using AI-supported Duolingo to improve their speaking skills and reduce anxiety. The interview transcripts were analyzed using MAXQDA. The key components of speaking proficiency examined in this study included vocabulary, pronunciation, and fluency, as identified by Ma (2025), Muluk (2025), Brown (2004). The interview transcripts are as follows:

**Table 9.** Interview transcript code

| Number | Name | Interview result | Code | |
|---|---|---|---|---|
| 1. | Ad | Q1: Can you describe your experience using AI-Duolingo in your speaking skill?<br>A: I am very happy. Using Duolingo I can explore my vocabulary. I can learn English through the game. It is really easy and enjoy. It can make my pronunciation better. I am not afraid to speak.<br>Q2: How effective do you find AI-Duolingo in improving your speaking skills?<br>A: Duolingo make me easy to understand the sentence. It can increase my spirit to continue the unit. It is really effective become my tool to study English because so easy to operate it.<br>Q3: Can you provide specific example? | Speaking Development:<br>1.Vocabulary<br>2.Pronunciation<br>3.Fluency | AI-Duolingo Tool:<br>1.Ease of use<br>2.Decreasing Anxiety<br>3.Effectiveness |

| Number | Name | Interview result | Code | |
|---|---|---|---|---|
| | | A: Using Duolingo. I understand how to say hello, introduce myself. It makes my speak can be fluent than before. I can understand the member of family. Duolingo makes me happy to speak up. I am not nervous again.<br>Q4: What are you having trouble in learning English using Duolingo?<br>A: I have difficult in speaking practice in first trying, find the vocabulary that same as the speaker say, answer the question in difficult unit.<br>Q5: Do you find yourself more engaged and decreased your anxiety in speaking with AI-powered Duolingo compared to traditional methods used commonly?<br>A: yes, I do. Duolingo makes me enjoy. I can be confident to speak.<br>Q6: How do you perceive the feedback provided by AI-Duolingo?<br>A: I like it. I got so many XP and good feedback to finish the unit when I have repetitions of the sentence fluently. It makes the English learning become effective and I can practice my pronunciation better.<br>Q7: Is it helpful for your learning?<br>A: Yes, it is. Because Duolingo help me ready for many vocabularies. Duolingo teach me how to say the word in good pronunciation.it makes me keeping big spirit and never give up to explore the speaking practice.<br>Q8: What concerns or challenges do you encounter when using AI-Duolingo for speaking practice?<br>A: my challenge is I have to choose the right answer in every question of unit. If not so I cannot get the XP. Choosing the right answer can make me have good pronunciation in speaking. I have to repeat the word in good pronunciation, although it is not easy but it is excited. | | |
| 2. | Em | Q1: Can you describe your experience using AI-Duolingo in your speaking skill?<br>A: After greeting to know Duolingo which makes me enjoy learning new vocabulary, especially when I got a prize claim from Duolingo. Wawww that was really cool.<br>Q2: How effective do you find AI-Duolingo in improving your speaking skills?<br>A: it is really effective. I had a dream of being able to marry a foreigner, that's right. Duolingo help me to speak English.<br>Q3: Can you provide specific example?<br>A: I can speak a sentence, a phrase, and after using Duolingo I really enjoy to finish the game. Then I practice how to say the word and sentence. It is so easy to operate Duolingo.<br>Q4: What are you having trouble in learning English using Duolingo?<br>A: Actually, it is okay. I can understand it, there is a little difficulty. Namely being confused about | Speaking Development:<br>1.Vocabulary<br>2.Pronunciation<br>3.Fluency | AI-Duolingo Tool:<br>1.Ease of use<br>2.Decreasing Anxiety<br>3.Effectiveness |

| Number | Name | Interview result | Code | |
|---|---|---|---|---|
| | | distinguishing between the meaning of this vocabulary and other vocabulary. I also have to study about new pronunciation. Q5: Do you find yourself more engaged and decreased your anxiety in speaking with AI-powered Duolingo compared to traditional methods used commonly? A: Yes, I do. I use Duolingo to study with my friends and to get XP competition. It can decrease my nervous to speak and to tell other about my feeling. Q6: How do you perceive the feedback provided by AI-Duolingo? A: It is very extraordinary task because using Duolingo help me create my own conversation with friend according to the desired topic. It makes me fluency in speaking than before. But from there we learn to choose the right vocabulary. That is suitable for appreciating the dialogue. Q7: Is it helpful for your learning? A: Yach, it really helps me. I usually use the word or sentences to speak when joking around with my friends, so it can add my vocabulary. It is so easy to use. Q8: What concerns or challenges do you encounter when using AI-Duolingo for speaking practice? A: The concerns are I have to repeat the vocabulary same as the speaker said in Duolingo. I have to finish the unit soon. | | |
| 3. | Es | Q1: Can you describe your experience using AI-Duolingo in your speaking skill? A: My current feeling using Duolingo is very excited, because I can understand a little bit of English. So, when using Duolingo I am really surprised. I can play game and practice speaking. It makes my spoken more fluent. Q2: How effective do you find AI-Duolingo in improving your speaking skills? A I started learning English since Junior High School. Since then, I like English and find Duolingo is really effective to help me in English learning. Q3: Can you provide specific example? A: Use Duolingo as tool to practice play a game and speaking then make dialogue with friend to practice. I can practice the sentence to speak easily and fluently. My friend also helps me to create the dialogue. Q4: What are you having trouble in learning English using Duolingo? A: I have difficult to repeat the voice same as the native speaker in Duolingo. I find so many new pronunciations in speaking. I have to learn. Q5: Do you find yourself more engaged and decreased your anxiety in speaking with AI-powered Duolingo compared to traditional methods used commonly? | Speaking Development: 1.Vocabulary 2.Pronunciation 3.Fluency | AI-Duolingo Tool: 1.Ease of use 2.Decreasing Anxiety 3.Effectiveness |

| Number | Name | Interview result | Code | |
|--------|------|------------------|------|---|
| | | A: Yes, I do. I am motivated to practice speaking because in Duolingo I can find some sentence and conversation to repeat and learn. It was so fantastic that I am not nervous again to speak. Q6: How do you perceive the feedback provided by AI-Duolingo? A: It is possibility accepted, actually it is okay. I can understand it, because I get so many XP and can move to other units. It means my speaking is better. I can speak more fluent and well. Q7: Is it helpful for your learning? A: It is, Duolingo makes me confidence, decrease my anxiety. I am comfort to speak. Q8: What concerns or challenges do you encounter when using AI-Duolingo for speaking practice? A: I have to learn how to say word correctly. I have to finish the units by doing the task in speaking. | | |
| 4. | Ra | Q1: Can you describe your experience using AI-Duolingo in your speaking skill? A: My feeling right now is well to learn English with Duolingo. It is amazing. It can make my English spoken more fluent. It is so easy to do the task in Duolingo. It is very fun and I enjoy it Q2: How effective do you find AI-Duolingo in improving your speaking skills? A: English is a widely spoken global language, ideal for communication and use Duolingo make my English learning become easy and effective to use. Q3: Can you provide specific example? A: The example is after using Duolingo I can repeat some pronunciation better in my dialogue. I can operate the Duolingo so easy. I can say word in sentence with better pronunciation. Q4: What are you having trouble in learning English using Duolingo? A: Sometimes I find it difficulty in English, it is especially in speaking to repeat the pronunciation fluently. Q5: Do you find yourself more engaged and decreased your anxiety in speaking with AI-powered Duolingo compared to traditional methods used commonly? A: Yes, I can keep my good spirit, I can be brave to speak. Q6: How do you perceive the feedback provided by AI-Duolingo? A: I understand the feedback. It makes me speak better. I have good pronunciation than before, Duolingo makes myself be brave to speak. Q7: Is it helpful for your learning? A: yes, that's right. It is useful and so easy to use. Q8: What concerns or challenges do you encounter when using AI-Duolingo for speaking practice? A: the challenges are I have to adapt myself to speak in good pronunciation when it is in repetition task, I have to know the meaning of vocabulary to fill the task. | Speaking Development: 1.Vocabulary 2.Pronunciation 3.Fluency | AI-Duolingo Tool: 1.Ease of use 2.Decreasing Anxiety 3.Effectiveness |

| Number | Name | Interview result | Code | |
|---|---|---|---|---|
| 5. | Wa | Q1: Can you describe your experience using AI-Duolingo in your speaking skill?<br>A: I like using Duolingo. It can help me to introduce my speaking better. I can find some vocabularies and new pronunciation in some words and sentences.<br>Q2: How effective do you find AI-Duolingo in improving your speaking skills?<br>A: I think it is really effective. It can help me find some words or some vocabularies.<br>Q3: Can you provide specific example?<br>A: Example: I can provide so many words than before. I can use English in my speaking to say hello with my friends.<br>Q4: What are you having trouble in learning English using Duolingo?<br>A: I cannot find how to spell; I just find the pronunciation by speaker in Duolingo.<br>Q5: Do you find yourself more engaged and decreased your anxiety in speaking with AI-powered Duolingo compared to traditional methods used commonly?<br>A: I can find myself better in speaking. I can speak more fluent and I can feel comfortable in learning English.<br>Q6: How do you perceive the feedback provided by AI-Duolingo?<br>A: I feel more fun and can accept the lesson better. It can be effective for me to learn how to speak fluently.<br>Q7: Is it helpful for your learning?<br>A: Yes, it is. It is really helpful to help me study English. Yes, that's right. It is useful and so easy to use.<br>Q8: What concerns or challenges do you encounter when using AI-Duolingo for speaking practice?<br>A: The concern of using Duolingo is improve my spoken English more fluent and good in pronunciation. | Speaking Development:<br>1. Vocabulary<br>2. Pronunciation<br>3. Fluency | AI-Duolingo Tool:<br>1. Ease of use<br>2. Decreasing Anxiety<br>3. Effectiveness | |

The students' responses reflected their progress in vocabulary, pronunciation, and fluency. The development of their speaking skills is illustrated in Figure 3, which ranks the enhancement of specific aspects as follows: vocabulary (39%), pronunciation (35%), and fluency (26%). The results of their speaking performance are presented in the figure below.
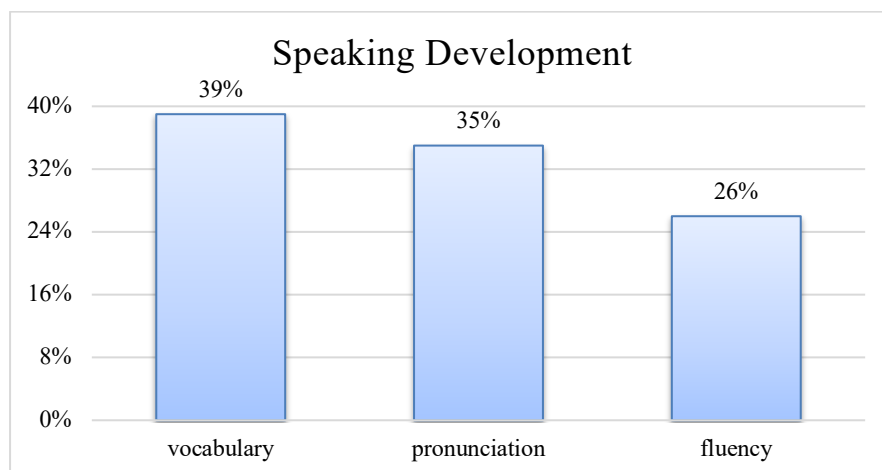
**Figure 3.** Speaking Development

Most interviewees said that using AI-supported Duolingo in a cooperative learning setting helped improve their vocabulary, especially basic words related to the lessons. The cooperative learning environment with AI-Duolingo offered interactive exercises, including speech recognition, which allowed students to practice and improve their pronunciation. By repeating words and phrases, students enhanced their articulation, intonation, and overall speaking clarity.

In addition, the study examined key features of the AI-supported Duolingo tool, including its ease of use, ability to reduce anxiety, and overall effectiveness (Tuong & Dan, 2024; Santos et al., 2019; Daud, 2025). Duolingo's instant feedback helped learners recognize and fix their mistakes, improving their pronunciation over time. Through interactive activities, repeated practice, and a clear learning path, Duolingo supported students in becoming more natural, confident, and fluent speakers. The platform also provided frequent exposure to language patterns, helping learners speak more automatically. Students highlighted three main benefits of using AI-supported Duolingo: ease of use, reduced speaking anxiety, and overall effectiveness. As shown in Figure 4, these were ranked as ease of use (44%), anxiety reduction (35%), and effectiveness (21%). The figure below visually presents these benefits.
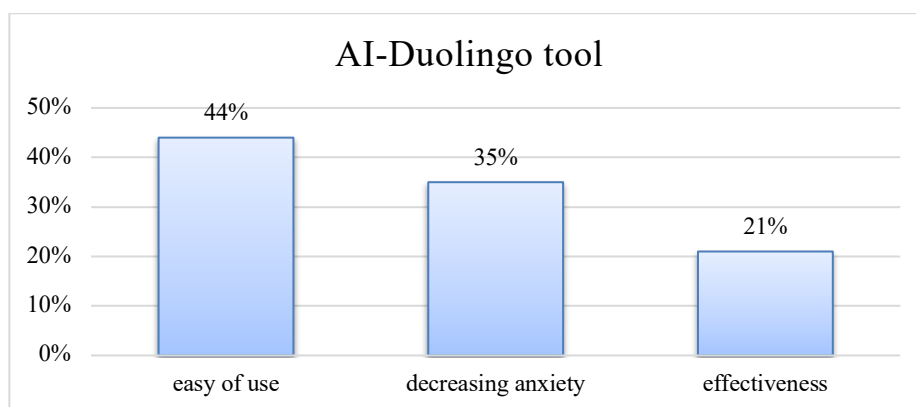


**Figure 4.** Artificial intelligence Duolingo

Students found Duolingo easy to use because of its simple interface, AI personalization, and game-like learning style. The app had a clean design with lessons broken into small, manageable parts. Students found Duolingo easy to use due to its simple interface, AI personalization, and game-like learning style. The app featured a clean design with lessons divided into small, manageable parts. Students valued the chance to practice speaking without fear of judgment, as the AI speech recognition provided instant, supportive feedback that helped reduce anxiety. They reported that Duolingo improved their vocabulary, grammar, and pronunciation but noted that real-life speaking practice is still necessary to build fluency. A study by (Ma, 2025) the AI that has been used has shown adaptable in helping its pupils with a range of daily duties. Similarly, Adov et al., (2017) it has been discovered that people's views toward technology might affect how they utilize smartphone apps to lessen their anxiety.

*Discussion*

This study aimed to answer the first research question about the impact of AI-supported Duolingo on students' speaking skills at SMKN 1 Kunduran. The ANOVA test showed some differences in speaking skills between the experimental and control groups during the first session, but these were not statistically significant. However, the experimental group consistently scored higher than the control group. This difference became clearer in later sessions, reaching near statistical significance ($p < 0.05$). These findings are consistent with previous research by Kim & Su (2024) which demonstrated that Artificial Intelligence has the potential to improve language proficiency, enabling learners to speak more fluently, with accurate grammar and a broad range of expressions appropriate for various contexts.

Regarding the second research question on the impact of AI-supported Duolingo in reducing students' speaking anxiety at SMKN 1 Kunduran, the ANCOVA test showed a significance value of 0.000. Since this is below 0.05, it confirms that AI-Duolingo effectively reduced speaking anxiety. The experimental group showed better learning outcomes than the control group. Additionally, the results indicate that the combination of AI-Duolingo and cooperative learning helped lower students' anxiety. These findings also confirm that the ANCOVA test assumptions were met. Additionally, they are consistent with previous research by Hapsari & Wu (2022), which highlighted that integrating an AI chatbot into classroom activities benefits both teachers and students by enhancing the speaking learning process, promoting students' critical thinking skills, reducing speaking anxiety, and increasing overall student engagement and enjoyment.

The third research question explored students' perceptions of using AI-supported Duolingo in cooperative learning to improve English speaking at SMKN 1 Kunduran. Using MAXQDA, the study analyzed key factors such as vocabulary, pronunciation, fluency, ease of use, anxiety reduction, and overall effectiveness. Students viewed Duolingo as effective for vocabulary learning, thanks to its

interactive exercises and spaced repetition, which helped them remember and use new words better. They also appreciated the AI-powered speech recognition, which gave immediate feedback on pronunciation, enabling self-correction and boosting their confidence in speaking.

These findings are consistent with the study by Fitria et al. (2023), which emphasized that Duolingo enhances grammar and pronunciation through features such as repetition, real-time feedback, and voice recognition. The platform's speech recognition technology evaluates users' pronunciation and provides targeted feedback, helping learners identify areas for improvement and practice until achieving more accurate pronunciation.

As noted by Jahiri et al. (2024), it is essential for educators, parents, and policymakers to understand how students engage with technology in the context of language learningThis study found that one major benefit of AI-powered Duolingo is its ability to reduce speaking anxiety, which sets it apart from previous research. By letting students practice speaking privately with instant AI feedback, Duolingo lowers the fear and pressure of making mistakes common in traditional classrooms. This helped students feel more confident during cooperative speaking activities. The research aims not only to improve speaking skills but also to reduce anxiety. Overall, students see AI-supported Duolingo as a useful tool to support speaking classes, especially for vocabulary, pronunciation, and fluency. However, they agree that real-life speaking practice with peers and teachers is still necessary for full conversational ability. Combining Duolingo with interactive speaking activities can make language learning even more effective.

## CONCLUSION

This study concludes that integrating AI-supported Duolingo into cooperative learning effectively improves vocational students' speaking skills and reduces their speaking anxiety. The use of Duolingo enhanced vocabulary, pronunciation, and fluency, while its interactive and gamified features created a more enjoyable and less stressful learning environment. The novelty of this research lies in combining AI-based learning with cooperative settings in vocational education, which has been rarely explored. To maximize results, AI tools like Duolingo should be complemented with real-life speaking activities. Future studies are encouraged to explore long-term effects and expand the integration of AI with emerging technologies to create even more engaging and effective language learning experiences.

## REFERENCES

Adebesin, F., & Pillay, K. (2022). Academics' Perspectives on the Strengths and Limitations of Blackboard Ally. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *13449 LNCS*, 285–295. https://doi.org/10.1007/978-3-031-15273-3_32

Adov, L., Must, O., & Pedaste, M. (2017). Attitudes towards mobile devices in estonian basic education:

Using the framework of the UTAUT model. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *10296 LNCS*, 319–329. https://doi.org/10.1007/978-3-319-58515-4_25

Alamer, A., & Almulhim, F. (2021). The Interrelation Between Language Anxiety and Self-Determined Motivation; A Mixed Methods Approach. *Frontiers in Education*, *6*. https://doi.org/10.3389/feduc.2021.618655

Alduais, A., Al-Qaderi, I., & Alfadda, H. (2022). Pragmatic Language Development: Analysis of Mapping Knowledge Domains on How Infants and Children Become Pragmatically Competent. *Children*, *9*(9). https://doi.org/10.3390/children9091407

Andersen, S. T. (2022). Diffusion of Innovative Digital Work Practices. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *13449 LNCS*, 278–284. https://doi.org/10.1007/978-3-031-15273-3_31

Bashori, M., van Hout, R., Strik, H., & Cucchiarini, C. (2022). Web-based language learning and speaking anxiety. *Computer Assisted Language Learning*, *35*(5–6), 1058–1089. https://doi.org/10.1080/09588221.2020.1770293

Benaouag, C. E. A., & Kharchi, L. (2024). Technological innovation and its role in promoting the competitive advantage of the industrial enterprises. *Journal of Innovations and Sustainability*, *8*(2), 12. https://doi.org/10.51599/is.2024.08.02.12

Brown, H. Douglas. (2004). *Language assessment : principles and classroom practices*. Pearson/Longman.

Cascio, W. F., & Montealegre, R. (2016). How Technology Is Changing Work and Organizations. In *Annual Review of Organizational Psychology and Organizational Behavior* (Vol. 3, pp. 349–375). Annual Reviews Inc. https://doi.org/10.1146/annurev-orgpsych-041015-062352

Chien, Y. C., Wu, T. T., Lai, C. H., & Huang, Y. M. (2022). Investigation of the Influence of Artificial Intelligence Markup Language-Based LINE ChatBot in Contextual English Learning. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.785752

Daud, N. M. (2025). From innovation to stress: analyzing hybrid technology adoption and its role in technostress among students. *International Journal of Educational Technology in Higher Education*, *22*(1). https://doi.org/10.1186/s41239-025-00529-x

Fadillia, E. C. (n.d.). The Application of Picture Series in Enhancing Students' Speaking Fluency Level. *Issue 1 Ser. IV*, *12*, 40–45. https://doi.org/10.9790/7388-1201044045

Fitria, N., Usman, M., & Sahara, N. (2023a). Duolingo Application for Advancing English Speaking Skills. *Journal of Innovation in Educational and Cultural Research*, *4*(4), 587–595. https://doi.org/10.46843/jiecr.v4i4.630

Fitria, N., Usman, M., & Sahara, N. (2023b). Duolingo Application for Advancing English Speaking Skills. *Journal of Innovation in Educational and Cultural Research*, *4*(4), 587–595. https://doi.org/10.46843/jiecr.v4i4.630

Guan, L., Lee, J. C. K., Zhang, Y., & Gu, M. M. (2025). Investigating the tripartite interaction among teachers, students, and generative AI in EFL education: A mixed-methods study. *Computers and Education: Artificial Intelligence*, *8*. https://doi.org/10.1016/j.caeai.2025.100384

Han, D.-E. (2020). The Effects of Voice-based AI Chatbots on Korean EFL Middle School Students' Speaking Competence and Affective Domains. *Asia-Pacific Journal of Convergent Research Interchange*, *6*(7), 71–80. https://doi.org/10.47116/apjcri.2020.07.07

Hapsari, I. P., & Wu, T. T. (2022). AI Chatbots Learning Model in English Speaking Skill: Alleviating Speaking Anxiety, Boosting Enjoyment, and Fostering Critical Thinking. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *13449 LNCS*, 444–453. https://doi.org/10.1007/978-3-031-15273-3_49

Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign Language Classroom Anxiety. In *Source: The Modern Language Journal* (Vol. 70, Issue 2). https://www.jstor.org/stable/327317

Hsu, T. C., & Chen, M. S. (2022). The engagement of students when learning to use a personal audio classifier to control robot cars in a computational thinking board game. *Research and Practice in Technology Enhanced Learning*, *17*(1). https://doi.org/10.1186/s41039-022-00202-1

Huang, Q. (2012). Study on correlation of foreign language anxiety and English reading anxiety. *Theory and Practice in Language Studies*, *2*(7), 1520–1525. https://doi.org/10.4304/tpls.2.7.1520-1525

Huang, Y. M., Silitonga, L. M., & Wu, T. T. (2022). Applying a business simulation game in a flipped classroom to enhance engagement, learning achievement, and higher-order thinking skills. *Computers and Education*, *183*. https://doi.org/10.1016/j.compedu.2022.104494

Ingber, A. S. (2025). Understanding screenshot collection and sharing on messaging platforms: a privacy perspective. *Journal of Computer-Mediated Communication*, *30*(1). https://doi.org/10.1093/jcmc/zmae023

Jahiri, M., Qerimi, G., & Gërguri, D. (2024). Exploring critical thinking of smartphone use from elementary school students in Kosovo. *Journal of Media Literacy Education*, *16*(3), 107–119. https://doi.org/10.23860/JMLE-2024-16-3-8

Katyeudo, K. K., & de Souza, R. A. C. (2022). Digital Transformation towards Education 4.0. *Informatics in Education*, *21*(2), 283–309. https://doi.org/10.15388/infedu.2022.13

Kim, A., & Su, Y. (2024). How implementing an AI chatbot impacts Korean as a foreign language learners' willingness to communicate in Korean. *System*, *122*. https://doi.org/10.1016/j.system.2024.103256

Li, M. (2025). Teaching, learning, and growing: the construction of a novice L2 writing teacher's personal practical knowledge. *Asian-Pacific Journal of Second and Foreign Language Education*, *10*(1), 5. https://doi.org/10.1186/s40862-024-00308-7

Ma, T. (2025). Systematically visualizing ChatGPT used in higher education: Publication trend, disciplinary domains, research themes, adoption and acceptance. In *Computers and Education: Artificial Intelligence* (Vol. 8). Elsevier B.V. https://doi.org/10.1016/j.caeai.2024.100336

Mohammed, S. H., & Kinyó, L. (2022). The cross-cultural validation of the technology-enhanced social constructivist learning environment questionnaire in the Iraqi Kurdistan Region. *Research and Practice in Technology Enhanced Learning*, *17*(1). https://doi.org/10.1186/s41039-022-00199-7

Muliyah, P., & Aminatun, D. (2020). Teaching English for Specific Purposes in Vocational High School: Teachers' Beliefs and Practices. *JET (Journal of English Teaching)*, *6*(2), 122–133. https://doi.org/10.33541/jet.v6i2.1756

Muluk, S., Habiburrahim, Dahliana, S., Zakaria, F., Azizah, & Safrul, M. S. (2025). The Impact of Synchronous Virtual Flipped Classroom on EFL Students' Speaking Skill. *Studies in English Language and Education*, *12*(1), 362–379. https://doi.org/10.24815/siele.v12i1.34814

Rahi, S. (2017). Research Design and Methods: A Systematic Review of Research Paradigms, Sampling Issues and Instruments Development. *International Journal of Economics & Management Sciences*, *06*(02). https://doi.org/10.4172/2162-6359.1000403

Santos, C. P., Hutchinson, K., Khan, V. J., & Markopoulos, P. (2019). Profiling personality traits with games. *ACM Transactions on Interactive Intelligent Systems*, *9*(2–3). https://doi.org/10.1145/3230738

Saraswati, P., & Devi, A. (2023). Mixed Methods-Research Methodology an Overview. *Nursing and Health Care*, *5*(4). https://doi.org/10.30654/mjnh.100024

Silitonga, L. M., Hawanti, S., Aziez, F., Furqon, M., Zain, D. S. M., Anjarani, S., & Wu, T. T. (2023). The Impact of AI Chatbot-Based Learning on Students' Motivation in English Writing Classroom. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *14099 LNCS*, 542–549. https://doi.org/10.1007/978-3-031-40113-8_53

Silitonga, L. M., Wiyaka, Suciati, S., & Prastikawati, E. F. (2024). The Impact of Integrating AI Chatbots and Microlearning into Flipped Classrooms: Enhancing Students' Motivation and Higher-Order Thinking Skills. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *14786 LNCS*, 184–193. https://doi.org/10.1007/978-3-031-65884-6_19

Tan, X., Cheng, G., & Ling, M. H. (2025). Artificial intelligence in teaching and teacher professional development: A systematic review. In *Computers and Education: Artificial Intelligence* (Vol. 8). Elsevier B.V. https://doi.org/10.1016/j.caeai.2024.100355

Tsiriotakis, I. K., Vassilaki, E., Spantidakis, I., & Stavrou, N. A. M. (2017). The examination of the

effects of writing strategy-based procedural facilitative environments on students' english foreign language writing anxiety levels. *Frontiers in Psychology*, *7*(JAN). https://doi.org/10.3389/fpsyg.2016.02074

Tuong, N. K., & Dan, T. C. (2024). A STUDY ON DUOLINGO MOBILE APPLICATIONS TO IMPROVE EFL STUDENTS' LISTENING COMPREHENSION PERFORMANCES. *European Journal of Alternative Education Studies*, *9*(1). https://doi.org/10.46827/ejae.v9i1.5342

Wang, C. C., Chen, H. C., & Hung, J. C. (2022). Employing Portable Eye Tracking Technology in Visual Attention of Cognitive Process: A Case Study of Digital Game-Based Learning. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *13449 LNCS*, 480–490. https://doi.org/10.1007/978-3-031-15273-3_53

Weller, S. C., Vickers, B., Russell Bernard, H., Blackburn, A. M., Borgatti, S., Gravlee, C. C., & Johnson, J. C. (2018). Open-ended interview questions and saturation. *PLoS ONE*, *13*(6). https://doi.org/10.1371/journal.pone.0198606

Yu, T. X., & Wan Mohammad, W. M. R. (2019). Integration of 21st Century Learning Skills (4C Elements) in Interventions to Improve English Writing Skill Among 3K Class Students. *International Journal of Contemporary Education*, *2*(2), 100. https://doi.org/10.11114/ijce.v2i2.4498