

# Digital Technologies in Group Work of High School Students

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This study explores how technology, specifically artificial intelligence (AI), can help high school students in Kazakhstan improve their English-speaking skills. Despite efforts to encourage multilingual learning, many students face challenges like limited vocabulary and fear of speaking English. The research tested AI tools, ChatGPT and AILA, in the classroom, comparing a group of students using these tools with another group learning through traditional methods. The results showed that students using AI improved their speaking skills, participated more in lessons, and felt more motivated. The study highlights how AI can make learning more personalized and interactive, helping students practice in a supportive environment. It also suggests ways teachers can use technology effectively in language lessons and considers ethical issues like privacy. The findings support using AI tools to make English lessons more engaging and effective, offering ideas for future research on how to use these technologies in schools.

## Introduction

In an era marked by constant change and complexity, education aims not only to transmit existing knowledge but also to cultivate the ability for lifelong learning and problem-solving, emphasizing the importance of educational and informational competence within a dynamic learning framework (Kunanbayeva, 2016). This imperative extends to Kazakhstan, where English is a foreign language, underscored by two major government initiatives, the “Trinity of languages” and the “100 steps towards realization of 5 institutional reforms” plan, aimed at promoting proficiency in Kazakh, Russian, and English, recognizing English as vital for global economic integration. Subsequently, the Ministry of Education has encouraged English teachers in public schools to prioritize the development of students’ communicative skills in the language (Ismail et al., 2018).

However, despite these efforts, studies reveal that students feel hesitant and lack confidence in speaking English, citing concerns about limited vocabulary, difficulty in expression, fear of making mistakes, and peer pressure discouraging them from engaging in English communication (Beisenbayeva, 2020).

As digital technologies continue to shape the educational landscape, this research focuses specifically on leveraging artificial intelligence to enhance the speaking skills of high school students in their English lessons. In light of the transformative role of technology in education, traditional teaching methods are being reimagined, with innovative approaches incorporating AI at the forefront. Hence, the aim of this research is to explore the potential of AI in improving the English speaking abilities of high school students.

To align with the aim, the subsequent objectives were established:

1. Theoretical Analysis of relevant literature.
2. Selection and assessment of AI tools.
3. Development of tailored speaking tasks (a bank of tasks).
4. Examination of the effectiveness of the AI intervention on an experimental group.

The object of the research is the field of English language education. The subject of the research is AI in teaching English.

This paper provides an examination of the potential of artificial intelligence and technology-enhanced language learning methods to significantly enhance high school students’ speaking skills. The theoretical significance of this research lies in its contribution to the evolving discourse on the effective integration of Artificial Intelligence (AI) and technology enhanced language learning, offering new insights into pedagogical strategies that enhance English speaking skills of high school students. The practical significance of this research lies in its potential to inform educators and policymakers on the effective implementation of AI and technology-enhanced language learning methods to improve English language instruction, thereby fostering enhanced speaking skills among high school students.

## Literature Review

A digital system is a way of handling information using a series of very tiny signals. These signals are like small pieces of data that can be used to record or send information. So, in a digital system, information is represented and processed using these small, discrete signals (Kalaichelvan, 1995). Technology can be understood as a human-created system that applies knowledge and structured organization to develop tools, methods, and processes aimed at achieving particular objectives (Volti 2009, p. 6).

## Information and Communication Technology

Various terms are employed to articulate the process of incorporating new technology into educational practices and research, particularly concerning investment and adoption. These terms encompass digital technology, information technology (IT), information and communication technology (ICT), and educational technology. Generally, these terms are interchangeable, lacking a distinct demarcation between them (Salavati, 2016). Digital technologies have emerged as a key tool for achieving the United Nations’ Sustainable Development Goals for 2030. Teaching and acquiring English language speaking skills has become notably more convenient today compared to a decade or two ago, courtesy of technological progress. Despite these advancements, a considerable number of individuals tend to underestimate the advantages and their potential in enhancing English language proficiency (Carraro & Trinder, 2021). In the realm of education, technology is typically described as a technical apparatus or instrument employed to improve instructional methods.

According to Lever-Duffy et al. (2002), “educational technology may encompass various forms of media, models, visual aids (both projected and non-projected), as well as audio, video, and digital media”.

The research conducted in Kazakhstani secondary schools in Astana have revealed that the use of technologies has led to increased levels of activity in the classroom, as well as to the increased levels of monologue and dialogue speeches (Mussa & Niyazova, 2018). Numerous studies addressing the integration of digital tools in classrooms frequently highlight a common challenge: students often lack the necessary skills to effectively utilize these tools. Fu (2013) identified that students’ insufficient technical skills pose a hindrance to the optimal use of ICT in educational settings. Tamim et al. (2015) reported challenges faced by students when employing tablets and smart mobile devices, citing technical issues, the need for expertise, and the distracting nature of the devices. These findings highlight the importance of teachers’ professional development in addressing these issues. According to Higgins (2012), providing skills training for learners on digital technologies is crucial for them to fully leverage the instructional benefits.

### Artificial Intelligence

The advancement of computing and information processing methods has led to the widespread application of artificial intelligence (AI) in the field of education. The integration of artificial intelligence in education introduces fresh possibilities, potentials, and challenges to the landscape of educational practices. Russman et al., (2015) conducted a comprehensive study of digital technologies, identifying six key components: artificial intelligence, big data, the Internet of Things (IoT), cloud computing, cybersecurity, and social media.

AI is regarded as a transformative technology with the potential to fundamentally alter numerous aspects of our existence (Vukmirović & Kresović, 2024). AI systems can learn from data, make decisions, and carry out tasks that were once thought to be exclusively within the human realm. AI is already being utilized in a wide range of industries, including healthcare, finance, manufacturing, and transportation (Russman et al., 2015). Of the numerous emerging technologies, AI has stood out as one of the most auspicious in enhancing the e-learning performance of students (Naim et al., 2023). AI is a powerful technology that can be used to solve complex problems in a wide variety of domains (Ali et al., 2023). Potential benefits of utilizing AI include personalized learning based on students’ individual needs and learning styles, real-time immediate feedback, enhanced language practice with an interactive and non-judgmental learning environment, efficient translation, access to various resources, and teacher support with automation of tasks (Ferman et al., 2021). Furthermore, it can be efficiently applied in oral teaching. AI technology can be used to create interactive conversational experiences for students (Cango Patiño et al., 2024). AI-powered chatbots or virtual language partners can engage in conversations with students, providing them with opportunities to practice their oral English skills in a comfortable and nonjudgmental environment. These AI systems can also provide instant feedback and suggestions for improvement (Yang, 2020). The newest literature on English speaking skills

emphasizes the importance of learner-centered instruction and the use of technology. For example, a recent study by Wang et al. (2023) found that learners who used a mobile app to practice speaking English made significant gains in their speaking skills. Another recent study by Chen (2024) found that learners whose learning was assisted with AI reduced their levels of public speaking anxiety due to the personalized instructions provided by the technology.

These and other studies suggest that learner-centered instruction and the use of technology can be effective ways to teach and learn English speaking skills (Table 1). However, it is important to note that these approaches should be used in conjunction with other traditional teaching methods, such as providing opportunities for practice, giving feedback, and creating a supportive learning environment (Chen, 2024; Wang et al., 2023). The following table evaluates the efficacy of AI in enhancing communication skills, its implications, its gaps and ethical considerations according to the results of the literature review article by Rusmiyanto et al., (2023).

Category	Findings
Effectiveness of AI in Developing English Learners’ Communication Skills	AI-powered tools improve learners’ speaking and pronunciation skills. AI-based interactive platforms enhance engagement and fluency through real-time feedback. Adaptive learning technologies personalize language instruction (Fathi et al., 2024).
Pedagogical Implications of Integrating AI in Language Learning	AI promotes learner autonomy and access to resources. AI offers personalized learning pathways and adaptive assessments. Virtual language tutors provide immediate and targeted feedback (Baltezarević & Baltezarević, 2024).
Ethical Considerations in AI-Driven Language Learning	Privacy concerns arise regarding data collection and use. Algorithmic bias in AI can perpetuate inequalities. Human AI interaction and the role of teachers need to be considered (Sywelem & Mahklouf, 2024).
Gaps and Future Directions	Further research is needed to explore long-term effectiveness. Studies should investigate optimal integration of AI technologies. Ethical frameworks should address privacy, security, bias, and transparency issues (Qiao & Zhao, 2023).

Despite the promising findings on the effectiveness of AI in improving speaking and pronunciation skills for English as a Foreign Language (EFL) students, several gaps remain unexplored. While existing studies highlight the potential of AI-powered tools to enhance fluency, engagement, and personalized learning, there is limited research regarding the long-term impact of AI on sustained speaking proficiency (Qiao & Zhao, 2023). Additionally, the optimal integration of AI tools into traditional language learning pedagogies remains underexplored, particularly in diverse EFL classroom contexts (Suvendu & Deb, 2024). Furthermore, there is insufficient focus on the role of teacher mediation alongside AI tools, addressing how educators can effectively balance human instruction with AI-driven feedback (Chan & Tsi, 2023). Finally, while ethical concerns such as data privacy and algorithmic bias are acknowledged, their implications for EFL learners' experiences with AI-powered language learning platforms require deeper investigation. Addressing these gaps could provide a more comprehensive understanding of how AI can be effectively leveraged to improve EFL students' speaking skills in a practical, equitable, and sustainable manner.

### Methodology

The methodology of this research is designed to explore the impact of artificial intelligence (AI) on improving high school students' English speaking skills. The study utilizes a mixed-methods approach, incorporating both theoretical analysis of relevant literature and an experimental design to assess the effectiveness of AI interventions. Through the development of tailored speaking tasks and the use of AI tools, the research examines how technology can be integrated into English language teaching to enhance students' communicative abilities.

This study involved two stages. The first involved an analysis of different AI tools to decide which is the most appropriate for the experiment. The second stage involved a quasi-experimental study involving the application of the chosen tool on an experimental group in comparison to a control group.

### Analysis of AI tools

During this stage of the research, AI tools were analyzed according to a licensed rubric for evaluating the use of an AI tool in education, developed by Aspenlieder and Mackie (2024). It includes eight criteria: functionality, accessibility, technical, privacy, social presence, teaching presence, cognitive presence, ethics. AI tools were rated from 1-3 (3 - works well, 2 - minor concerns, 1 - serious concerns) under each category, and for the sake of the experiment, a score was added if an AI tool featured voice recognition, the maximum score being 25. The Large Language Models (LLMs) were then compared in accordance with their structure, database and accessibility (Table 2).

**Table 2**  
*Alignment of AI Tools With the Rubrics*

1.	Category	Alignment with the rubrics	Overall score	Side notes
LLa-Ma	Large language model	Functionality - 2, accessibility - 1, technical - 2, privacy - 1, social presence -1, cognitive presence - 2, ethics - 1, voice recognition - 0.	10	Not publicly available.
Chat GPT	Large language model	Functionality - 3, accessibility - 2, technical - 3, privacy - 3, social presence - 2, cognitive presence - 3, ethics - 2, voice recognition - 1.	19	Has a premium version, and is still being worked on. Has a voice recognition feature.
Gemini	Large language model	Functionality - 3, accessibility - 3, technical - 1, privacy - 1, social presence - 1, cognitive presence - 3, ethics - 2, voice recognition - 0.	14	Is biased, does not have a voice recognition feature.

The LLMs were then compared in accordance with their structure, database and accessibility (Table 3):

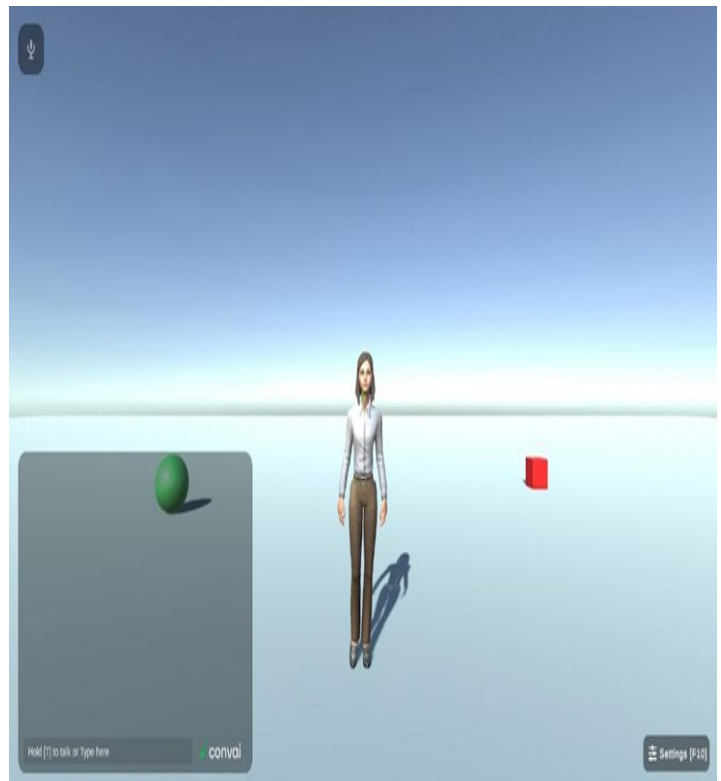
**Table 3**  
*Side by Side In-detail Comparison of the LLMs*

Criteria	Chat GPT	LLAMA	Gemini
Model Architecture	Based on GPT architecture, fine-tuned for conversation	Based on transformer architecture	Also based on transformer architecture
Training Data	Trained on diverse internet text sources	Trained on large-scale, diverse textual data	Likely trained on extensive but undisclosed dataset
Capabilities	Generates coherent and relevant responses	Specialized in generating informative and factual answers	Designed for humanlike conversational interactions
Customization	Offers flexibility for fine-tuning and customization	Provides pre-trained models and fine-tuning options	Customization details not widely known
Availability	Available through OpenAI's API for integration	Not publicly available, requires licensing	Not publicly available, not released as standalone API
Ethical Considerations	Implements measures for ethical content moderation	Advocates for responsible AI use and ethical guidelines	Likely follows Google's ethical guidelines
Performance and Accuracy	Known for generating contextually relevant responses	Known for factual accuracy and informative responses	Performance metrics not widely disclosed

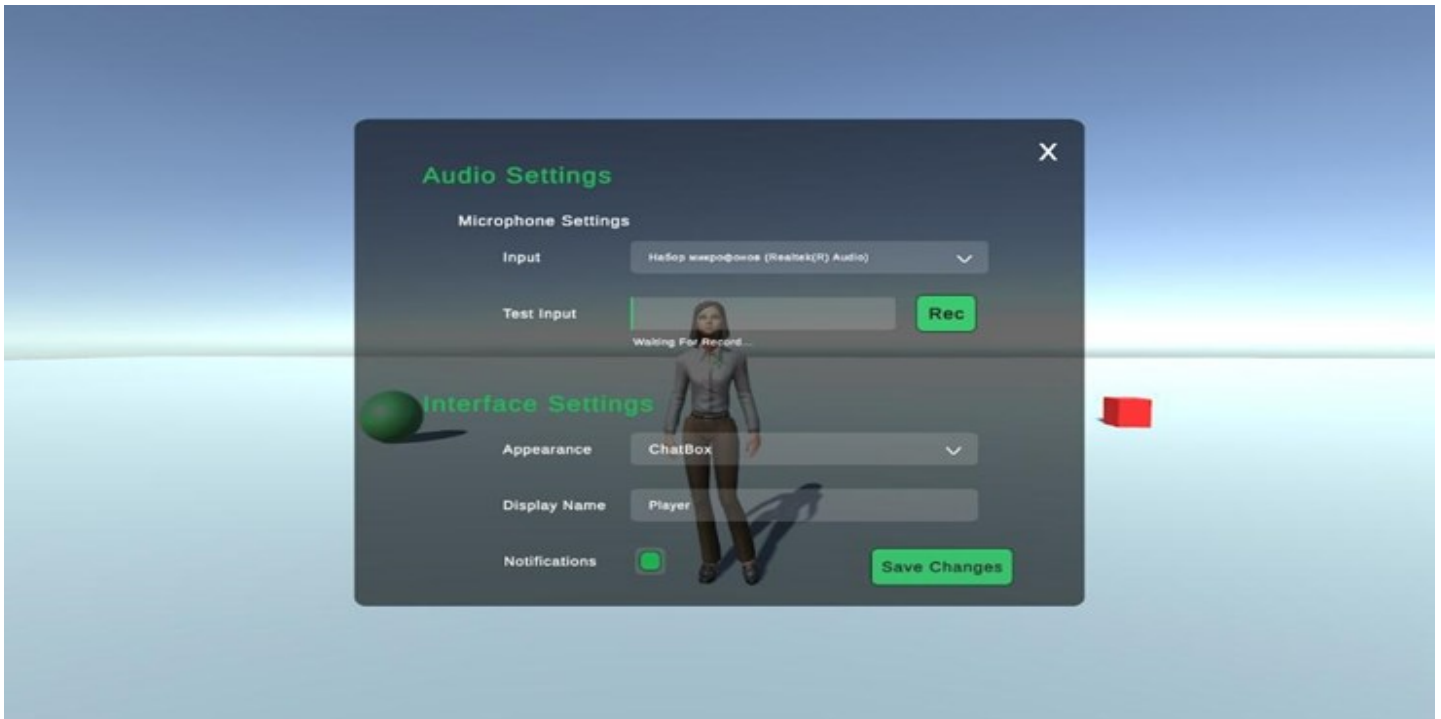
In this comparison, ChatGPT stands out for its availability, transparency, and flexibility in customization, while LLAMA excels in providing factual and informative responses. Gemini's specific advantages may include its alignment with Google's ecosystem and potential integration with other Google services, although details about its performance and customization options are less publicly known compared to ChatGPT and LLAMA. Because of ChatGPT's availability and accessibility it has been chosen to be used in the experimental part alongside with AILA.

AILA is an AI-based character which I built on the Unity platform for game development (Figures 1 and 2). It operates on AI, therefore is able to imitate and simulate real-life conversations. It was specifically tailored to teach English and does not exceed its boundaries. Its knowledge bank has been uploaded with the methodology of teaching monologic and dialogic speaking. The users have to press and hold the [T] button to talk and the microphone of a laptop records the audio which then gets transferred onto the screen, to the box which transcribes the audio. What makes AILA suitable for the experimental part is its accessibility, since it is completely free. It is also flexible, as there is an opportunity to change the appearance, voice and look of the character. Moreover, only the internet is needed for its usage and it does not collect data.

**Figures 1 and 2**



*AILA's interface*



### Participants

The study involved 25 tenth-grade students (aged 16-17) from a public school in Astana, all of whom were enrolled in STEM-focused classes. The participants were divided into two groups: 13 students in the experimental group and 12 students in the control group.

The experimental group consisted of six male and seven female students, while the control group of four male and eight female students. The selection process was based on pre-existing class divisions rather than random assignment, ensuring that students in both groups had a similar educational background.

### Quasi-Experimental Study

A quasi-experimental research is a type of study used to examine cause-and-effect relationships, events, interventions, or conditions as they naturally occur in real-life settings. Researchers analyze the impact of a specific “treatment” (like a policy change or a new teaching method) on a group, even though the groups might not be perfectly controlled or randomly selected.

The experimental part of the present study consisted of 3 stages: pre-intervention, while-intervention, post-intervention in the experimental group, and of two stages in the control group: pre-intervention and post-intervention (Table 4).

Before initiating the pre-intervention, the bank of tasks was designed in accordance with their English levels and with the implementation of the CAI (Figure 3). The book that is used for 10th graders at the research base is the Action book that was designed for science schools of Kazakhstan. The bank of tasks was based on Ur's (2012) classification of speaking activities implemented using Slavin's (2010) formal and informal learning groups and prioritized Alexander's (2004) collective and purposeful principles for a dialogic classroom. It included classroom tasks and homework tasks aligned with the curriculum and the Action book topics.

During the pre-intervention stage the students of the both experimental and control groups were pre-tested on their current English speaking proficiency levels. Both pre- and post-tests were designed based on the IELTS speaking exam consisted of two tasks, first one being a personal introduction (name, age, interests, hobbies, etc.), with a chosen speaking question being the second one, where students had to answer a question on a random topic. The students were then graded by me and their English teacher, with a score from 1-9, using publicly available IELTS speaking criteria.

**Table 4 . Quasi-Experimental Study Process**

Lesson	Task description	Learning Group	Language focus	AILA during the lesson	ChatGPT for homework
Week 1. Lesson 1	Task 1 (discussion)	Discussion takes place in informal learning groups.	Grammar: reported speech	Initiates the discussion on technological breakthroughs	Students each choose a technological breakthrough related to a specific field (medicine, technology, archeology, etc.) and discuss its benefits with ChatGPT.
Week 1. Lesson 2	Task 2 (reaching a consensus)	Students present their ideas about the positive and negative impacts of robots in formal learning groups.	Vocabulary: electronics	AILA listens to their presentations and has to provide ideas about the positive impacts of robots.	Students talk to ChatGPT about life without robots.
Week 1. Lesson 3	Task 3 (talking about yourself)	Students express their ideas about having a robot as a part of a family in informal learning groups.	Grammar: quantifiers, countable and uncountable nouns	AILA talks to students about what it is like to be a robot.	Students talk to ChatGPT about life with robots.
Week 2. Lesson 1	Task 4 (debate)	Students work in formal groups and give arguments about pros and cons of a life with robots.	Vocabulary: science and technology	AILA is a moderator of the debate.	Students debate with ChatGPT about pros and cons of a life with robots.
Week 2. Lesson 2	Task 5 (publicity campaign)	Students work in informal groups, first they discuss how AI affects their life, then each group has to do a campaign for or against AI.	Grammar: The passive	AILA asks brainstorming questions and gives feedback on their campaigns.	Students talk to ChatGPT about what the future will be like with AI.
Week 2. Lesson 3	Task 6 (debate)	Students work in formal groups, giving arguments about whether colonizing space is a future or fantasy.	Grammar: Conditionals 2 and 3	AILA asks brainstorming questions and moderates the debate.	Students talk to ChatGPT on what life would be like if humanity colonized space.

**Figure 3**  
*The Bank of Tasks Design*



**Table 5**  
*The Stages of the Intervention in the Experimental Group*

Pre-Intervention	While-Intervention	Post-Intervention
Data collection: 1. Pre-Test	2. Adaptation of the CAI based on the curriculum. The implementation of the CAI with the bank of tasks.	Data collection: 1. Post-Test Data analysis: 1. Quantitative and qualitative analyses of the collected data on the tests and surveys.

Unlike the control group, the experimental group had a while-intervention stage, which is the adaptation of the CAI for their curriculum and the book they use (Table 5 and 6). The CAI was programmed to generate certain questions related to those topics and was tailored to assess their speaking.

**Table 6**  
*The Stages of the Intervention in the Control Group*

Pre-Intervention	Post-Intervention
Data collection: 1. Pre-Test	Data collection: 1. Post-Test Data analysis: 1. The analysis of the collected data on the tests.

The students were also encouraged to use ChatGPT at home to prepare for their speaking homework. To use ChatGPT's conversation feature, students had to download the free app, after downloading, they had to sign up. Then they had to click on the headphone icon, and after ChatGPT connects to the microphone, the users just have to speak to activate it. ChatGPT listens and after three seconds, provides its answer. Although it does not have a certain humanoid look as AILA does, its voice can be changed to a male or a female one. After talking to ChatGPT, transcripts of conversations remain and students had to copy and paste those transcripts to me as a proof of a completed homework.

The intervention involved participants in the experimental group engaging in structured conversations with the Convai system, while the control group received instruction through conventional methods. The conversations were based on selected topics relevant to their curriculum. After the intervention period, a post-test was administered to both groups to assess any changes in speaking proficiency. The post-test consisted of similar conversation tasks to the pre-test but with different prompts to ensure validity and prevent participants from memorizing responses.

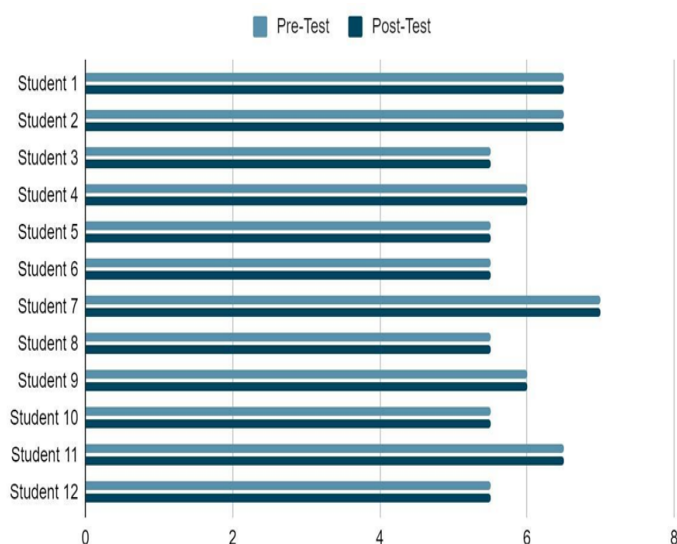
### **Ethics**

The study adhered to ethical considerations by ensuring that students participated voluntarily. Given that the participants were minors (aged 16-17), obtaining informed consent was an essential step. Additionally, confidentiality and anonymity of student data were maintained to protect their privacy. Since the study involved an intervention, efforts were made to minimize any potential risks or disruptions to students' learning experiences.

### **Results**

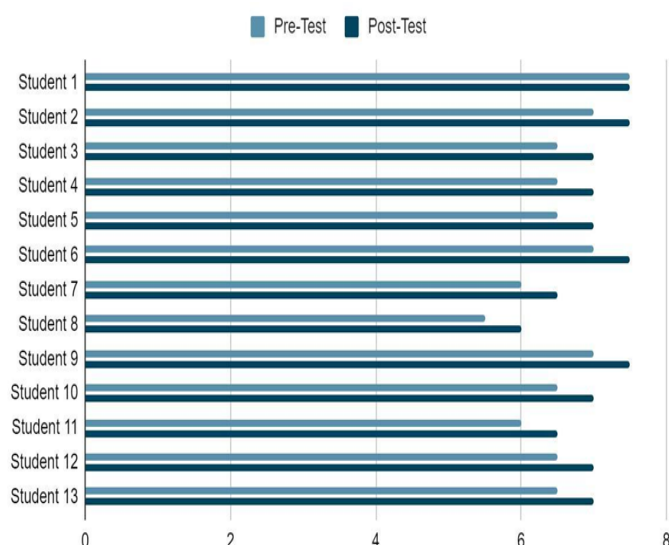
During the pre-test in the control group, it was also evident as it was in the experimental group, that there were some exceptional students, while the English speaking levels of the rest of the class were somewhat on the same level. As there was no intervention, and the lessons continued with traditional methods, the results of the post-test did not show any changes.

**Table 7**  
*Pre- and Post-test Results in the Control Group*



During the pre-test in the experimental group, it was evident that there were some students who showed significantly better English speaking competencies than others, and some students were noticeably deficient in speaking practice (Table 7 and 8). One of the main reasons for their deficiency was observed to be lack of practice, insecurity, and smaller lexical resources.

**Table 8**  
*Pre- and Post-test Results of the Experimental Group*



During the pre-test in the control group, it was also evident as it was in the experimental group, that there were some exceptional students, while the English speaking levels of the rest of the class were somewhat on the same level. As there was no intervention, and the lessons continued with traditional methods, the results of the post-test did not show any changes.

The group score average of each class was calculated using the Jamovi software, and according to the analysis, the experimental group has shown a slight improvement of their speaking abilities. The results of the paired t-test for the experimental group are as follows:

**T-statistic:** -12.00

**P-value:**  $4.84 \times 10^{-8}$

**Mean Pre-Test Score:** 6.54

**Mean Post-Test Score:** 7.00

**Mean Difference:** +0.46

The extremely small p-value ( $< 0.05$ ) indicates that the improvement in speaking scores from the pre-test to the post-test is statistically significant. This suggests that the intervention had a positive effect on students' speaking abilities. The control group's results have not indicate an improvement between their tests (Table 9).

**Table 9**  
*Score Average of Pre- and Post-tests*

Group score average	Pre-Test	Post-Test
Experimental group	6.5	7.0
Control group	6.0	6.0

Another facet of the experiment involved tracking the number of utterances made by students in the experimental group during lessons. This aspect not only provided insights into their engagement but also highlighted the extent of their speaking practice. Prior to the intervention, the range of utterances typically fell between 0-1 to 3-4. However, during and after the intervention, a noticeable uptick was observed. The minimum number of utterances increased to 3-4, while the maximum surged to 7-8. This observation underscores a significant enhancement in both engagement levels and speaking proficiency, indicating a boost in motivation among the students.

## Conclusion

When comparing the literature with the experimental findings, it becomes evident that AI technologies have slightly transformed learning methodologies, particularly in making education more student-centered and autonomous across various countries. However, concerns regarding the technical proficiency of students in utilizing AI have surfaced in many contexts. Nonetheless, such issues were not prominent during our experiment due to the user-friendly nature of the applications employed. ChatGPT, which assisted students in their speaking assignments, was already familiar to them, thus mitigating any technical difficulties. AILA, designed for simplicity with a single interface solely dedicated to speaking practice, further facilitated smooth integration into the learning process.

The bank of tasks aligned with the curriculum proved effective during the experiment, incorporating a variety of relevant speaking tasks. Notably, tasks involving reaching a consensus sparked heightened engagement among students and the utilization of both formal and informal learning groups revealed varying levels of student interest. While informal groups fostered spontaneity and interest due to their random formation, formal groups, albeit pre-planned, instilled a sense of purpose and long-term commitment, particularly evident in group research activities.

Pre- and post-observations demonstrated a slight increase in student utterances during lessons, indicative of improved practice and motivation, further augmented by the use of ChatGPT for homework assignments. Students particularly appreciated the personalized nature and confidentiality of AI-based speaking practice, as highlighted it was revealed in the open-ended survey responses.

Pre- and post-test results of the experimental group indicated a slight improvement in their speaking proficiency (Table 8), which aligning with the aim of the paper, proves the efficacy of the usage of AI in facilitating speaking skills of high school students. The control group, however, which did not receive an intervention, has not demonstrated any changes in their post-test results (Table 7). Moreover, it is also essential to acknowledge individual variations. One student showed no improvement, likely influenced by their already advanced proficiency level and occasional absences during the experiment.

In conclusion, the amalgamation of theoretical frameworks with empirical evidence from our experiment highlights the transformative impact of AI technologies on language education. The user-friendly nature of AI applications, exemplified by ChatGPT and AILA, addressed concerns regarding technical proficiency among students, paving the way for enhanced engagement and autonomy in learning. Our findings underscored the imperative of rebalancing the curriculum to prioritize speaking activities, aligning with established educational frameworks. The effectiveness of the bank of tasks and varied learning group dynamics further accentuated the role of AI in fostering personalized and effective language learning experiences. While acknowledging individual variations in outcomes, the overall improvement in student speaking proficiency signifies the potential of AI as a valuable adjunct to human instruction. Moving forward, careful consideration of AI tool selection, focusing on reliability, lack of bias, and accessibility, will be pivotal in harnessing the full potential of AI in education. As we continue to explore the evolving landscape of AI in language education, our study serves as a testament to its capacity to revolutionize learning methodologies, ultimately empowering learners to achieve their language acquisition goals more effectively and confidently.

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