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Using Artificial Intelligence (AI) to Improve Students' Speaking Skills in Higher Education

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Abstract
Technology has advanced significantly in recent years, and it is widely utilized in various fields, including education. Numerous applications are available for teaching English; however, one technology that has yet to be implemented in university-level English instruction is Artificial Intelligence (AI). AI can be integrated into English teaching and learning to enhance students' language skills, particularly their speaking abilities. This study aimed to assess the improvement of students' speaking skills through the use of Artificial Intelligence (AI) in English language education. The research employed an action research methodology and was conducted at the University of Tangerang Raya. Data were collected through observations, questionnaires, and interviews. Additionally, the researcher administered an English-speaking test that assessed four aspects: overall communicative effectiveness, fluency, comprehension, and appropriateness of language. The findings of this study indicated that the use of Artificial Intelligence (AI) in English language teaching and learning increased students' interest and motivation in learning English. Furthermore, the students' speaking skills also showed significant improvement.

Keywords: *Artificial intelligence, Chat Bots, speaking skills, technology in ELT.*

INTRODUCTION

In this era of globalization, technology has advanced significantly to meet our needs, and it is utilized in various fields, including education. As technology develops, human characteristics and behaviors also change, affecting how individuals learn. Today, the world is experiencing the Fourth Industrial Revolution, one of the key components of which is the use of internet platforms and mobile devices. This has led to the rise of e-learning in the educational field. E-learning utilizes new multimedia technologies and the internet to enhance the quality of learning by providing access to resources, services,

opportunities for exchange, and remote collaboration (Abik, 2012). It requires a micro-computer or laptop connected to a wired network, allowing learning to take place anywhere and at any time. However, several challenges arise with distance learning, including high internet usage, weak server signals, and cost issues. Research conducted in Indonesia by Rahardjo (2016) found that students were generally capable of accessing the internet, and their knowledge and willingness to utilize these media were quite high. Nevertheless, their ability to navigate the internet remained at a medium level. This indicates that e-learning still faces numerous challenges. Learning is not solely an individual endeavor; it also involves the networks and their connections (Siemens, 2008). Some fundamental principles of this approach include the idea that learning and knowledge emerge from diverse sources, learning is a process facilitated by the interconnections of specialized nodes or information sources, and learning may occur through devices external to humans. To facilitate continuous learning, fostering and maintaining these connections is essential.

Engagement between students and the learning process is crucial for encouraging and sustaining this connection. Engagement refers to a meaningful psychological interaction between the learner and the instructional environment that promotes the achievement of learning goals. It supports the building of relationships among new content and personal knowledge, as well as among various elements within a lesson (Clark, 2016). There are two types of engagement: behavioral and psychological. Behavioral engagement encompasses the actions a learner takes during a lesson to enhance learning, such as clicking on items, dragging and dropping elements, and producing text. Conversely, psychological engagement involves relevant cognitive processing that aids learners in reaching instructional goals by encouraging attention to pertinent material, mentally organizing it into a coherent structure, and integrating it with existing knowledge. One effective way to foster engagement in the instructional environment is through the use of Artificial Intelligence (AI). AI enables students to interact and connect with the virtual world via mobile technology and can simulate real-life situations for learners. Artificial Intelligence (AI) mimics the cognitive capabilities of the human brain (Badaró et al., 2013). It is often regarded as a branch of Computer Science focused on designing intelligent systems—those that exhibit characteristics associated with human behavior and intelligence. According to Mariño and Primorac (2016), AI encompasses a range of methods, techniques, and tools that create models and solve problems by simulating the behavior of conscious entities. Nabiyev (2005) describes artificial intelligence as the capacity of a computer or computer-controlled machine to perform tasks related to higher mental processes, such as reasoning, inference, generalization, and learning from past experiences, qualities typically associated with humans.

Artificial intelligence offers numerous benefits to education. Students in the faculty of education view the use of AI in learning positively (Keles, 2021). Ermağan (2022) notes that AI is used to create individualized educational content and environments that support students' personal development. Additionally, AI considers the unique characteristics of the target individual or group for successful self-learning. One of the complex aspects of language education arises when the individual traits of the target audience come into play. In their research, Kafai and Burke (2014) reported that AI in education aims to enhance and support skills such as problem-solving and creativity through collaboration with AI, rather than merely acquiring knowledge in a specific

domain. Furthermore, Marrone (2022) stated that artificial intelligence can aid students in developing their creativity. AI technology can also support learning platforms, not only reducing the time required for various tasks but also enhancing capacity in areas beyond human capability, such as analyzing learners' knowledge levels, facilitating feedback, improving teaching strategies, and making the teaching and learning process more effective (Kuprenko, 2020). Studies have shown that AI technologies can check students' grammar and provide sophisticated feedback (Bailin, 1987), process students' language input (Holland et al., 1993), and deliver more efficient grammar feedback (Nagata, 1996). While early AI studies primarily focused on grammar, recent advancements in computer technology have revealed AI's broader potential. Applications of AI in language classrooms have been shown to benefit learners by facilitating meaningful communication (Lu, 2018), enhancing collaborative roles (Tafazoli et al., 2019), improving speaking performance (El Shazly, 2020), increasing motivation (Yin et al., 2021), and enhancing reading comprehension (Bailey et al., 2021). A study conducted by Sumakul (2022) found that teachers have a positive perception of using AI technology in their English as a Foreign Language (EFL) classrooms, illustrating how AI can assist both teachers and students in the language learning process.

The various platforms and trends promised by the future development of AI in education are increasingly appealing (Ocana-Fernandez et al., 2019). One application of AI that has been utilized in language classrooms is the chatbot. Bots are computer programs designed to simulate naturally intelligent communication using text or speech technologies (Satar, 2021). They serve multiple purposes, including facilitating online conversations in distance learning, providing patient conversational partners willing to engage with learners even as they repeat content or make mistakes, and alleviating stress for students experiencing anxiety when learning a second language. Learners can communicate freely with bots, taking the time they need to express themselves without fear of judgment. Additionally, bots can offer immediate corrections or seek clarification when they do not understand a learner's input. Yin and Satar (2020) observed that chatbots, particularly those designed for educational purposes, can engage in meaningful negotiation with learners and elicit modified output, especially concerning lexical items that may cause misunderstandings. Moreover, Satar and Özdener (2008) found that bots facilitate written communication, indicating that written chat practices can resemble spoken practice and contribute to the development of conversational skills.

At the University of Tangerang Raya, the use of Artificial Intelligence (AI) in English language learning had not yet been implemented. Consequently, the researcher was interested in investigating students' speaking skills through AI-based learning. The AI application utilized in the classroom was Character AI, which is similar to a chatbot. This study aimed to answer the research questions regarding the process of English language learning through artificial intelligence and the outcomes of this approach.

METHODS

This study employed action research as its methodological framework. The action research aimed to investigate the process of improving students' speaking skills through the use of artificial intelligence and to evaluate the results of this improvement. According to McNiff (2002), action research is one approach to implementing professional development, beginning with committed individuals in their field and collaborating with others to form a critical community. Additionally, Burns (2010) noted

that action research seeks to address systematic problems to achieve meaningful improvements. The method used in this study followed the spiral model of action research, which consists of four stages: planning, action, observation, and reflection. Each of these stages was considered one cycle, and the study comprised two cycles.

This study incorporated both quantitative and qualitative data. The data were collected through observations, interviews, and questionnaires. Quantitative data were derived from students' speaking test results in English, while qualitative data were obtained from the English learning process facilitated by artificial intelligence. Specifically, students' English-speaking test results served as the quantitative data, and the qualitative data included observations, interviews, and questionnaires. Observations in this study aimed to examine the process of students' English learning with the assistance of artificial intelligence. The researcher acted as a participant observer, teaching the students using AI tools. Continuous monitoring took place through daily notes, which documented the learning process and provided input for future lessons. The researcher also conducted interviews with the students to understand their experiences while learning with artificial intelligence. These interviews were semi-structured; the researcher posed questions aligned with the questionnaire to gather more detailed information from the students. The study utilized a questionnaire to assess students' feelings about learning with artificial intelligence, employing an attitude scale or measurement scale. The questions were formatted as statements, requiring respondents to check or circle their answers; the responses were based on a Likert scale. Furthermore, the study included a conversational test to measure students' speaking skills, adapted from the Occupational English Test (OET), specifically designed to assess speaking proficiency. Scoring was based on a rating scale from one (very poor) to five (excellent) and was categorized into four areas: overall effective communication, fluency, comprehension, and appropriateness of language.

The research took place at the University of Tangerang Raya, chosen by the researchers because they were English lecturers at the institution. The study occurred over approximately sixteen meetings throughout the semester. Participant observation was a key component, wherein the researchers conducted lessons using artificial intelligence. Participant observation involves the researcher acting as a member of the community related to the research topic (Emzir, 2012). The researchers observed the process of English learning facilitated by artificial intelligence and distributed questionnaires and conducted interviews to gather additional information from the students.

RESULTS AND DISCUSSION

The Process of Learning Using Artificial Intelligent

Learning Process in Pre-Cycle

The first observation was conducted at the beginning of the 4th semester, involving six meetings prior to the midterm test. During these six sessions, the lecturer explained various expressions clearly and accurately. In addition to the explanations, the lecturer also provided examples of correct pronunciation for the words. Throughout the first observation, the lecturer consistently asked each student to repeat the pronunciation of the words demonstrated.

Based on the observations made during this pre-cycle, it was found that the students' speaking skills in the advanced speaking course were still lacking, as both pronunciation

and conversational abilities were not at an acceptable level. Furthermore, some students appeared to be uninterested. In response to these findings, the lecturer sought ways to improve the students' speaking skills.

The lecturer decided to alter the learning resources used for the observations. Previously, the lecturer relied solely on the Internet and standard textbooks. Now, the lecturer opted to enhance the learning experience by incorporating artificial intelligence.

Learning Process on Cycle 1

The learning process in Cycle 1 consists of four stages: planning, acting, observing, and reflecting.

Planning

Planning involves a series of activities conducted in Cycle 1. The planning for Cycle 1 took place after the ninth meeting on May 22, 2023. During this meeting, the lecturer introduced Character AI and explained its purpose and intent. The lecturer also provided guidance on how to use Character AI, covering everything from creating an account to communicating with the AI robot. Additionally, communication expressions were explained to facilitate students' conversations with the AI robots.

Acting

Acting encompasses the activities that occur in Cycle 1. After providing detailed explanations during the planning stage, the lecturer asked students to open the website "character.ai." Once the website was opened, the lecturer instructed students to engage in activities that had been demonstrated. The students were given fifteen minutes to converse with the AI robot.

Observing

The lecturer observed that students were enjoying the speaking learning process through Character AI, as it helped develop their speaking skills. However, students were still somewhat hesitant in their communication with the AI robots, and the conversations tended to be quite brief.

From the observations of 15 students, the researchers identified another obstacle in communicating with the AI robot: a slightly poor internet connection, which hindered the intensity of speaking due to long loading times when attempting to record sound. Additionally, several students resorted to using Google Translate to translate Indonesian into English. They were not yet accustomed to communicating directly in English and required Google Translate to assist them in their interactions with the AI robots. While the lecturer noted that the students showed a reasonable level of enthusiasm, this enthusiasm did not remain consistent throughout the session.

The lecturer also identified activities that did not unfold as planned. When students communicated with the AI robot for 15 minutes, some experienced disruption in their internet connections, which caused them to lose concentration and engage in conversations. Nevertheless, it was observed that using Character AI helped increase the students' confidence in communicating, as they perceived AI as just a robot and felt less embarrassed about making mistakes in their use of language.

Reflecting

In Cycle One, the learning process did not go perfectly, and various obstacles persisted. The students' overall understanding of AI characters in Cycle 1 was quite good. The duration for conversation practice with the AI robot was set at 15 minutes, after which students had discussions in pairs in front of the class for about 15-30 minutes.

After practicing with the AI robot, the lecturer asked students to present their conversations in pairs. The lecturer provided several themes for these conversation exercises. However, many students still stuttered during the discussions and relied on Google Translate. The lecturer instructed students not to use Google Translate while speaking in front of the class. At this stage, the lecturer observed that the students' speaking skills in Cycle 1 did not meet expectations. Therefore, it was necessary to implement further actions in Cycle 2.

Learning Process on Cycle 2

The process of Cycle 2 also consisted of four stages: planning, acting, observing, and reflecting.

Planning

Planning in Cycle 2 was carried out during the 10^{th} meeting on June 3, 2023. In this cycle, the lecturer once again explained Character AI, as was done in Cycle 1. However, the difference this time was that the lecturer provided an internet connection for the students to ensure that poor connectivity issues would not arise. Once the students had stable internet access, the lecturer allotted 15 minutes for them to communicate with the AI robot, stipulating that they were not allowed to use Google Translate during this time.

Acting

During the 15 minutes allocated by the lecturer, the students effectively utilized this time to communicate with the AI robot. After the time was up, the lecturer randomly selected pairs of students to come to the front of the class. The lecturer then provided several topics for the pairs to discuss, which were different from those assigned in Cycle 1. Each pair was given 15 minutes to converse in front of the class. The students displayed a high level of concentration and focus while communicating.

Observing

In this cycle, the students appeared more confident and enjoyed engaging with their partners in front of the class. Additionally, they consistently communicated well without resorting to Google Translate. This improvement was notable compared to their performance in Cycle 1.

Reflecting

The learning process in Cycle 2 was significantly better than in Cycle 1. All students seemed to enjoy the activities and demonstrated increased concentration. Furthermore, they appeared well-prepared for their conversations in front of the class. There were no activities that did not go well in this cycle, as the lecturer observed that the students remained focused and engaged. In other words, there was a clear improvement in the overall learning process.

THE RESULTS OF STUDENTS SPEAKING SKILL TEST

Test Results in Cycle 1

The following table is the results of students' speaking test in Cycle 1, which includes four aspects. The aspects are communication effectiveness, fluency, comprehension, and appropriate language. There is a rate of student speaking quality from very poor to excellent. The score of very poor is 0-24, poor is 25-59, good is 60-79, very good is 80-90, and excellent is 91-100.

Table 1. Students' speaking test results in cycle 1.

No.	Student Achievement	Excellent	Very Good	Good	Poor	Very poor
1.	Overall Communication Effectiveness	3	2	4	4	2
2.	Fluency	2	2	1	5	5
3.	Comprehension	2	1	2	6	4
4.	Appropriateness of Language	4	3	3	3	2

In Cycle 1, three students got excellent for overall communication effectiveness. Two students got very poor, then four students got good, another four students got poor, and two students got very poor.

The number of students' fluency and comprehension in Cycle 1 was still lacking. Therefore, it was necessary to take action to improve speaking Cycle 1. Table 1 shows the score of the speaking test rating. Diagram 1 shows students' improvements in Cycle 1.

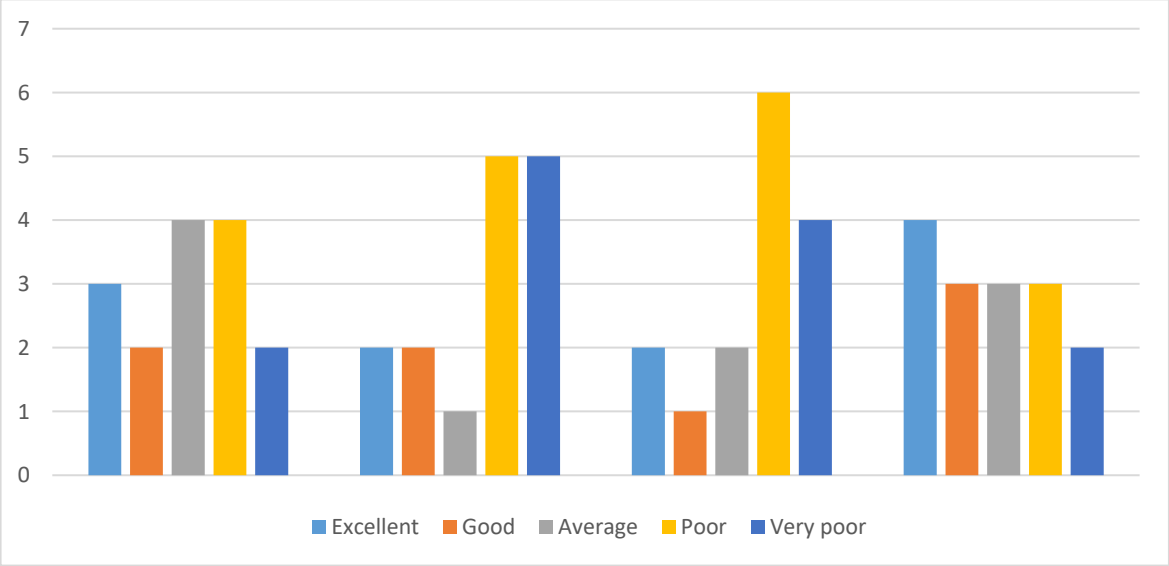

Figure 1. The result of students' speaking test in Cycle 1.

Test Results in Cycle 2

The following table is the result of students' speaking test in Cycle 2. The test was given when the students had a conversation with their partner. Four aspects that were scored as in the Cycle 1. The aspects were overall communication effectiveness, fluency, comprehension, and appropriateness of language.

Table 2. Students' speaking test results in cycle 2.

No.	Student Achievement	Excellent	Very Good	Good	Poor	Very poor
1.	Overall Communication Effectiveness	11	2	2	0	0
2.	Fluency	10	3	2	0	0
3.	Comprehension	9	5	1	0	0
4.	Appropriateness of Language	11	3	1	0	0

From the result of the students' speaking test in Cycle 2, there was an improvement in students speaking skills. In Cycle 2, for the aspect of communication effectiveness, the students who got excellent were 11 students. For fluency, students who got an excellent were 10 students. For comprehension, nine students got excellent, and for appropriateness of language, 11 students got excellent. There were no students that got poor and very poor in all aspects.

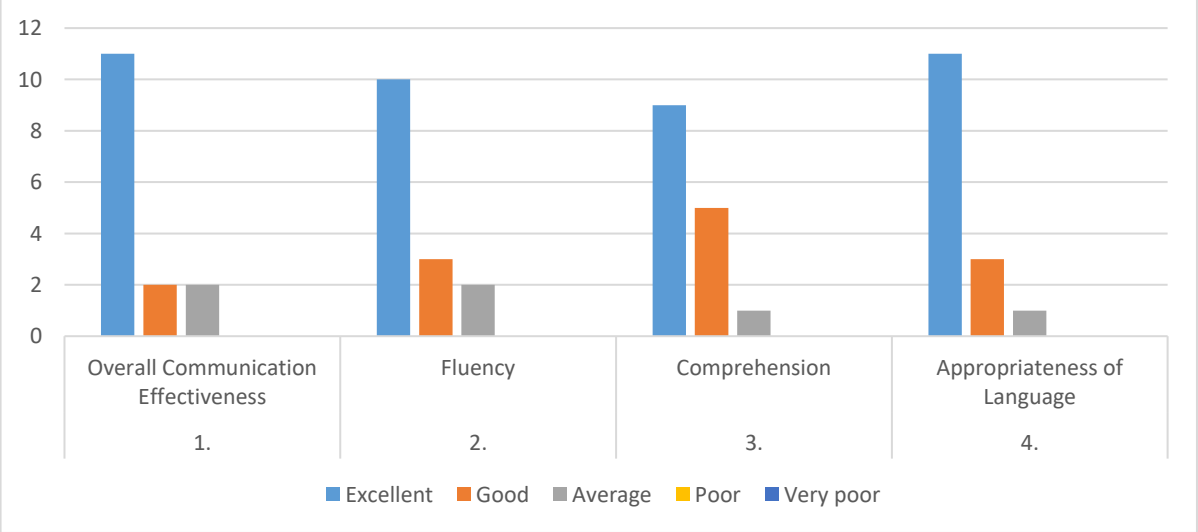

Figure 2. The result of students' speaking test in Cycle 2.

Compared to Cycle 1, which results can be very lacking, the test speaking result in Cycle 2 is better. Therefore, there was an improvement in students' speaking skills when they learned to speak English using artificial intelligence. The improvement can be seen in the chart below:

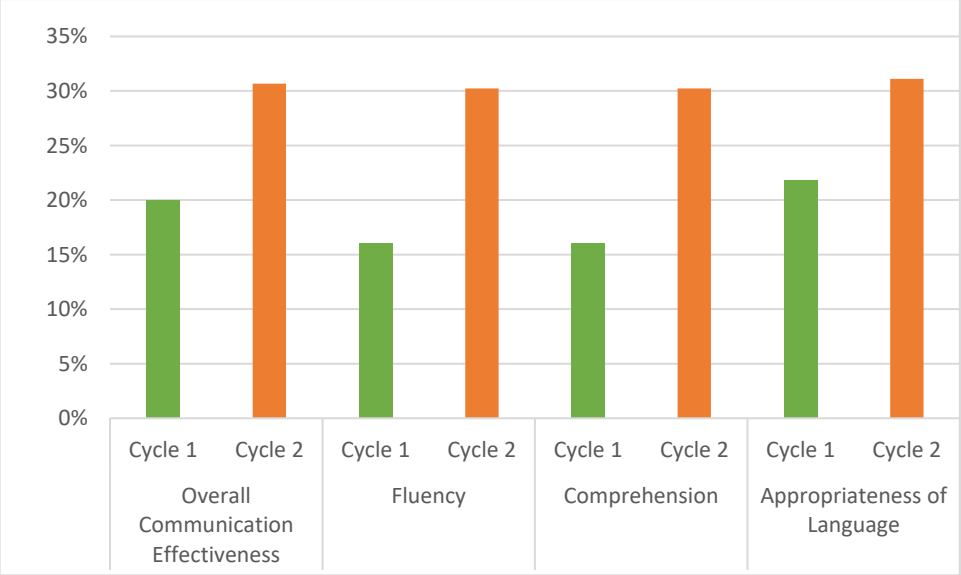

Figure 3. The percentage between Cycle 1 and Cycle 2.

CONCLUSION

In conclusion, students' speaking skills improved by using artificial intelligence. It can be seen from the learning process during Cycle 1 and Cycle 2. The improvement can also be seen in students' speaking test results. Using artificial intelligence made students interested and motivated to learn to speak. They were more confident because they were not afraid of making mistakes while practicing English with Robot AI. They were also more enjoyable in the learning process. The students did not have any difficulties in operating the Character AI. In other words, using artificial intelligence can be a fun way to help students learn to speak English. However, internet stability is still one of the problems in using artificial intelligence. Therefore, the university must provide a good internet connection for the students.

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