

# AI-Driven Classroom Conversations: Revolutionizing Education 5.0 for Enhanced Student Engagement in Speaking Skills

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## ABSTRACT

This study examines how modern education uses Artificial Intelligence (AI) technologies to improve student engagement and speaking skills. This study emphasizes the importance of tailored learning experiences and the potential of AI to transform language learning in the context of Education 5.0. The research seeks to fill the gap in education literature by showing how AI-driven classroom talks can improve student engagement and speaking skills. The study carefully evaluates AI-facilitated speaking activities in primary and high schools using a qualitative research design. The research shows how AI transforms student learning, improving engagement and speaking competency through case studies. The findings suggest using AI to supplement instructors rather than replace them. The study also explores Education 5.0's theoretical foundations, showing how AI can be used to personalize education, use big data to improve education and increase education quality. Future studies should examine AI's effects on other language skills and its application to varied student demographics. This research advances the discussion on AI and education, enabling more nuanced studies of technology-enhanced learning.

**Keywords:** *Artificial Intelligence in Education, Education 5.0, Student Engagement, Speaking Skills Enhance*

## Introduction

The "AI-Driven Classroom Conversations: Revolutionizing Education 5.0 for Enhanced Student Engagement in Speaking Skills" is a research paper that delves into the implementation of AI technology in improving student engagement in speaking skills. The introduction provides some background information and explains the purpose and scope of the research study. This research is interdisciplinary, drawing on knowledge from the fields of AI in education, discourse analysis, and spoken language studies. The research aims to contribute to literature both in AI and education and in spoken language studies, with a focus on modern AI-based educational technology and innovative, student-centered methods of teaching and learning (Zhou, 2023) (Singh and Hiran2022) (Guan et al., 2020). Different user groups should be considered when writing the research paper - the AI and education researchers, educational practitioners, policymakers, and the general public. For this reason, it is necessary to include professional terminology, provide explanations in simple language, outline the current situation, and be clear about who this matters to and how the situation can be improved. The objective of this

AI-based research is not to replace human teachers and human interactions with technological devices but to facilitate interaction between students and between students and educators. The effectiveness of AI-driven student practical lessons and real-life communication will be explored by analyzing the conversations both students and educators made in the learning process. The research will also provide insights into the correlation between different types of conversation and the development of speaking capability (Rustamov and Mamaziyayev2022) (Bailey et al.2021) (Wahyuningsih & Afandi, 2020). Theoretical insights will be discussed, including the modifications of the well-known TBLT theory (Task-Based Language Teaching) and its relations to student-centered, AI-driven new teaching practices. This research begins with an introduction to the field of AI in education, providing an overview of the current state of the art and recent trends. After explicating the research's aim and the study's theoretical foundation, the paper will discuss the methodology, followed by introducing a conceptual framework of what an ideal AI-driven classroom should look like and what benefits

might come from such teaching practices.

Due to the fast-developing AI technology, the potential of using AI in modern education has been raised, and many researchers started to investigate the relevant field. With the evolution of such a new type of education system, it has been proposed that AI will make a significant contribution to helping teachers and students in Education 5.0 (Sułkowski et al.2021) (Tavares et al.2023). AI is defined as the simulation of human-like intelligence processed by a machine (Pelau et al., 2021) (Collins, 2021). This includes aspects such as learning, logical reasoning, and self-correction. The AI technology can recommend the best lesson plans and give tips to students. Besides, an AI-powered robot can support teaching and learning in the classroom by conducting lessons with students and showing emotions to interact with them. Hopefully, this could make lessons more engaging and help students to enjoy their learning.

In 2016, Zhao and Alvarez proposed a new education model, Education 3.0, which emphasizes the communal and connective aspects of learning in the digital age (Tang et al., 2022) (Bylieva et al., 2021) (Wang et al., 2021) (Luna et al.2022). In some countries, the education system is shifting from Education 4.0 to Education 5.0. Education 5.0 is an educational approach that is built upon the idea of "lifelong learning", a future envisioned by social scientists and educators (Jamaludin et al.2020) (Keshav et al.2022) (Mourtzis et al., 2022). Lifelong learning serves students' self-growth, self-discovery, and preparation for the future. The primary philosophy of Education 5.0 is to encourage independent thinking and curiosity by nurturing critical and creative minds (Salmon & Barrera, 2021) (Levanon, 2021) (Ho et al., 2023). This is fundamental for the development of students' personality and articulation. Classrooms are equipped with digital walls and interactive surfaces that are connected to the internet, and learners can take control of their learning by manipulating these screens and actively engaging in real-life inquiry.

In comparison to these earlier forms, Education 4.0 is the most modern form of education. Teachers no longer act as the main knowledge distributors as there are varieties of resources on the internet to aid students' learning. With the introduction of personalized and adaptive learning technology powered by AI, the focus is to provide learners with autonomy and self-determination in their learning. This is what we

call "Education 4.0".

Education 1.0 is based on the traditional way of learning, where teachers are in full control of the students' learning (Miranda et al.2021) (Hursen). The only educational resources available are textbooks, and that limits the teaching and learning process. With the advance of technology and the internet, Education 2.0 introduced the idea of e-learning. Teachers are more integrated with students, and student-centered learning is more visible. However, teachers were still the main source of knowledge (Butt et al.2020) (Miranda et al.2021).

Education 4.0 is a term used to describe the impact of the fourth industrial revolution on education (Spöttl & Windelband, 2021) (Butt et al.2020) (Teo et al., 2021). The fourth industrial revolution emphasizes the proliferation of AI and the need for digital transformation in society. Consequently, the jobs and skills required by future generations are changing - students now need more than the basic skills in reading, writing, and mathematics to succeed. A widely accepted model of the different types of education is Education 1.0, 2.0, 3.0, and the most modern form, Education 4.0.

The research aims to explore the use of AI-powered conversational agents in enhancing student engagement in speaking and listening in modern language and culture classes. The potential for AI-driven language learning is great, as students are using a new digital tool that encourages them to practice speaking the target language in a low-stakes environment outside the classroom (Jeon, 2024) (Tai, 2022) (Divekar\* et al.2022). However, we know little of how these digital tools impact student engagement in language learning and how teachers can best integrate them into current pedagogical practices. This study is designed to address the research gap by examining student engagement levels in classroom conversations in AI-rich language education environments and comparing the engagement levels between traditional and AI-driven classroom conversations. By doing that, we may begin to understand the potential impact of AI on student engagement and explore effective methods for implementing and integrating AI-driven language learning into innovative teaching methodologies, all of which align with the principles of Education 5.0. The significance and relevance of this project are evident in that it has far-reaching implications for research and practice in the use of AI technology in language education. In the era of Education 5.0, educators and

policymakers are constantly searching for new ways of engaging students and encouraging them to play an active role in their education to develop relevant skills for a digital world. This research may contribute to the broader discourse on the development of an effective and sustainable educational model that utilizes the power of emerging technologies, such as AI, for the collective advancement of all educational stakeholders. By focusing on student engagement, a key element of quality education, this project may generate new knowledge that significantly advances our understanding of the potential applications of AI technology in Education 5.0 (Wamba-Taguimdje et al.2020) (Zhang & Aslan, 2021) (Yang et al.2021) (Trakadas et al.2020). Every stakeholder in modern language and culture education, from students and teachers to advisors and administrators, may benefit from the findings and recommendations of this research. Moreover, the case studies of this project might shed light on how to implement and integrate AI-driven classroom conversations in other modern language and culture educational contexts. With a variety of teaching strategies, curriculum design, and program development considerations, such empirical evidence derived from the local level currently may help to build effective methods in light of the common goal of utilizing technology to improve educational experiences, which eventually informs policy decisions and directions.

The research will focus on the development of oral skills amongst students with the use of AI. The focus of the research will be to analyze how technology can facilitate and enhance teaching and learning experiences in the classroom and how the modern-day language lab in the form of an AI-driven speaking classroom can help students develop their speaking skills. The research will contribute to a significant advancement in the area of teaching and learning by employing technology. Also, it will serve as a useful guide and example to the teachers and practitioners who are interested in carrying out similar projects in the classroom. The research findings will be provided, giving solid evidence of how language teaching and tools can be meaningfully incorporated with technology. The ways technology is currently being used in language learning and teaching will be brought forward and critically evaluated, and then, the concept of AI, the potential uses and benefits of AI language classroom will be introduced, and a conclusion on the future development of this

technology will be made. Also, humanities and education researchers and practitioners may find the methods and the outcome of the research useful, and the outcome of the research will contribute to the academic field as a publication and to the education field as an evidenced reference for developing curriculum and teaching practices.

"Education 5.0" is a term used to represent the latest development in the field of education that stresses the importance of a student-centered learning environment that utilizes technology and new pedagogic methods to transform, globalize, and enhance education on multiple levels (Oberer & Erkollar, 2023) (Ong & Annamalai, 2023). The theoretical framework indicates that students are encouraged to assimilate technology in their learning process from the early years of education up until the highest level possible and extend the same technology to other sectors in support of grand national efforts and changes in global economy trends. As this particular level of educational technology concentrates on introducing AI as a core utility to push the boundaries of the new pedagogic methods in the creation of interactive and customized learning paths (Bhutoria, 2022) (Davies et al., 2021) (Yan et al.2024). This leads to a globalizing effort for education and calls for a more academically challenging transformation of the whole process of knowledge transfer through the use of modern technology. Sagahyoon and Alrazooqi (2018) further detail the technological mechanism that would be in place in Education 5.0. According to the authors, Education 5.0 will harness the potential of AI in a bid to get rid of physical barriers between the professor and the different students and change the standard "one-size-fits-all" model of knowledge dissemination. AI in Education 5.0 will help in realizing 'mass' customization (Pizoń & Gola, 2022) (Maddikunta et al.2022). Every student could potentially have a different educational experience thanks to the ability to make more or less any style of learning available to anyone, anywhere with the help of AI customization (Chen et al.2023) (Ahuja and Bala2021) (Kabudi et al.2021). This is because AI systems can track students' progress and tailor learning activities in response to the capabilities and preferences of individual students by presenting the right content and setting the right level of challenge or support that is most appropriate to that student, daunting barriers and limitations created by traditional methods. Thus, the theoretical framework spells the evolution of

the latest technology in education and its implications for shifting knowledge transfer from a traditional teacher-centered approach. The notion of modern education with immersive technology suggests the necessity to develop critical and creative thinking within society and mental capacity and genuine understanding at the cognitive science level of how individuals learn. With the integration of AI, customization of learning experience to provide the right level of intellectual-stimulating challenges that contribute to sustainable efforts in drawing attention and turning knowledge into real mental acquisition is made fruitful.

As Education 5.0 is just recently being introduced, not many countries and schools have adopted and possessed it currently (Sanusi et al., 2022) (Al et al.2021). However, the local and international educational community has been enthusiastically discussing and exploring the potential impact and challenges with the development in technology and the upcoming Education 5.0. It is believed that Malaysia, working mutually with collaboration partners from the education industry, can serve as the regional capacity building, skills advancement, and research hub for training and education in this region.

By having the new model of personalized learning and the school is in the middle of the community, it is hoped that the reformed Education 5.0 can champion academic excellence, no matter in student success or well-being (Alam2022) (Zou et al.2021) (Yin, 2022). Therefore, under such a community education ecosystem, it is believed that a data-sharing system can be formed lately, where student learning can be continuously enhanced through the support from parents and other education partners by accessing their performance data, and implementing the relevant and appropriate intervention when necessary.

Such transformation in the learning model can be seen evidently from what kind of technology used, like the traditional personal computer is now changing to the mobile device, and the smart classroom where using of 'smart' technology, like Virtual Reality (VR) Headsets for virtual school trips and 3D printing for Innovative Design in school, is being introduced nowadays (Kamińska et al.2023) (Halabi, 2020).

The main objective of Education 5.0 is to make full use of the data, AI technologies, and connectivity in the education system, to nurture creativity and critical thinking for the students in

society (Tang et al., 2020) (Miranda et al.2021) (Behnamnia et al.2020). It is claimed that the education system and the learning model are being shifted from conventional teacher-centered and instructional learning to a more student-centered and personalized learning environment, with the help of the evolution of technology and the introduction of the new paradigm progressively.

Education 5.0 is considered a new learning model that emphasizes personalized learning and the use of AI and data in education (Alamri et al., 2021) (Zhai et al.2021) (Ouyang & Jiao, 2021) (Guan et al., 2020). This model is based on the evolution of the education industry, from the traditional Education 1.0 to the most recent Education 4.0, which is the ICT (Information and Communications Technology) in Education. Education 5.0 focuses on the integration of the physical, digital, and even biological worlds, which are also recognized as the fourth industrial revolution.

Education has been defined as the process of receiving or giving systematic instruction, especially at a school or university (van et al.2020) (Abu et al.2021) (Camacho et al., 2021). Over the years, there is high evidence that supports the significance of oral communication for students. With rapid advancement of technology, much of today's written information is communicated digitally through the use of computers, and increasingly, through the internet. It is undeniable that the trend of using digital tools for instruction and learning will continue to increase. However, according to Yi, regarding the need of developing speaking skills in the 21st century, what has been created as the new paradigm, education 5.0, is an integrated system that incorporates traditional didactic education, interactive education with the aid of technology, and lifelong learning that continues beyond the academic lives of students (Tang et al.2023) (Chen et al., 2020) (Heng & Sol, 2021). It is indicated Transforming Education: Meanings, myths and complexities of 21st century learning that students learn more than just from the content of the speech, students also pay attention to the way they construct the words, the tone and the body movements, and the context of the conversation (Yulianti and Sulistiyawati2020) (Middleton, 2020). Based on the study in the language learning of foreign language education, researchers found that speaking skill is considered the most important among the four skills, and it is undeniably true that it is important across the curriculum. Students who are able to communicate well with words will be at an advantage in team

projects where they can speak and share with the team, express their own feelings and interact with others, debate, and give and receive feedback which are helpful for their improvements (Bailey et al.2021) (Shim & Lee, 2020). With the diversified society and technology era, teachers are required to teach students the speaking skills. However, from the article "The Disguise of Technology," it is mentioned by the author that speaking and listening skills are difficult to incorporate into teaching especially when the class is huge and the time is limited. The author revealed that he used to have the same feelings but with the help of technology, students' speaking skills can be assessed and improved even outside the classroom. In fact, speaking assignments that are completed on a computer using an electronic portfolio are effective in many ways as indicated in the article "Using Technology to Improve Speaking" from Asia Call (Cabrera-Solano2020) (Kusuma et al.2021) (Barrot). Students can develop knowledge and skills through the process of using technology (Kwangmuang et al.2021). The author of the article "Digital Connections" expressed his feelings of excitement and fulfillment when he saw his students were well engaged in a task that required peers' support and debate in a discussion: They were working on a writing project, and each of them needed to find a peer's writing to support their opinions. One of the students engaged in the discussion excitedly asked, "Can you guys help me? I need to find someone's writing as evidence because I know mine is somewhere but I just can't tell which one is better!" It is important to continue our knowledge on the existing theories and our practices in the classroom, and apparently, many researchers have agreed that given technological tools have great potential in promoting students' speaking skills which is the most challenging among the four skills.

With more personalized learning and rationalization of educational resources, it is more likely to attract and retain high-talent students and academic staff, and promote the globalization of education (Yan & Yang, 2021) (Fang & Lu, 2021) (Chen, 2022). The emergence of AI and the Education 5.0 initiative would bring a lot of excitement throughout the entire education sector and it is a great chance to reform the traditional way of teaching and enhance the student-teacher interaction. With wide usage and familiarity of AI in various technological solutions, research and smart devices in the society and daily life, there is no exception for the education sector to embrace it

and to drive changes. Although there are existing concerns and barriers to applying AI in education - privacy, security, ethical issues, and required fundamental changes to teacher's role, it is believed that the overall benefits that AI can bring to Education 5.0 would outweigh the barriers. It could lead to a successful voyage of education renovation.

In Education 5.0, teachers are regarded as cognitive coaches and mentors, and students should study in a more liberal voice and utilize their creative minds; however, not just listen to lectures passively (Elsayary et al.2024). The potential technology of AI integrated with the Education 5.0 has several fold impact on improving the education system (Tavares et al.2023). First of all, AI provides an innovative way for tailored, on-demand educational experiences, and learning progress could be constantly watched and revised based on individual needs, strengths and weaknesses. Secondly, AI helps to aggregate and analyze the generated big educational data, to investigate the rules of learning and teaching and eventually become useful knowledge for educational professionals. In addition, the data-driven AI technology also helps quality of education and reduces the cost and inefficiencies in the educational eco-system. This is particularly important for higher education institutes to adapt the changes of using technology to improve student accommodation and teaching quality in face of the rapid increase of student enrollment.

In the recent years, the application of artificial intelligence (AI) technology has been extended to innovate the education system worldwide, and a new era of education, namely Education 5.0, has been proposed (Tavares et al.2023). AI produces a real revolution in almost every industry, and education makes no exception. Education 5.0 is a creative and disruptive educational initiative to construct and embrace learning that develops in various mobility scenarios, uses modern technologies and open source capacities, and manifests an atmosphere of global citizenship. It is based on education which advocates creativity, intelligence, accountability, and networking that contributes to the people and society.

In the framework of Education 5.0, this research seeks to fill a notable void in the literature by showing how AI can be used to improve student engagement and public speaking abilities. The direct effect of AI-driven classroom discussions on various parts of learning has not

been the subject of many in-depth studies, despite the increasing interest in incorporating AI into educational contexts. To address this gap, our study aims to contribute to the greater conversation around individualized learning experiences by offering empirical data on how AI may create a more engaging and supportive setting for improving public speaking abilities.

### **Method**

The researchers utilized a qualitative research design to allow for a detailed exploration of the effectiveness of the program aimed at enhancing student speaking skills. Qualitative research is primarily used to explore and interpret social phenomena (Muzari et al.2022) (Levitt, 2021). For this study, 45 students participated in a 12-week program in which they engaged in a variety of AI-driven speaking activities in a computer-assisted language learning classroom, which is typically designed to provide an interactive and individualized learning environment. The program consisted of three 55-minute sessions each week. Five students were observed throughout the duration of the program and their classroom interactions were video-recorded at three different time periods to provide a comprehensive set of qualitative data. The video recordings were transcribed and used in the analysis of student engagement levels and effectiveness of AI-driven classroom conversations. Student work and reflections, classroom observations, and teacher reflection journals were collected to triangulate the qualitative data and insight about student learning and experiences. Student reflection and teacher reflection journals are a type of self-study method in which students and teachers record their thoughts and feelings about the learning experiences, which could be a valuable source of qualitative data for understanding the impact of the teaching and learning process. This is particularly important when the researchers are evaluating the effectiveness of a method designed to enhance a specific type of skill, such as speaking. Through the journals, students and teachers can provide information about the progress and struggles encountered throughout the program. Such data not only provides valuable information for the teachers in improving their teaching, but also for the researchers to offer suggestions for future effective practices. On the other hand, quantitative data in the form of questionnaires and surveys were collected at the start and upon the completion of the program to understand students' perceptions on their speaking

skills and the effectiveness of AI-driven activities. The survey utilized in this study is self-designed and was analyzed both descriptively and inferentially.

The purpose of this qualitative study is to examine the program's impact on students' speaking abilities in depth; this justification for including 45 students comes from the research methodology. Understanding student participation and the impact of AI-driven speaking activities within a computer-assisted language learning classroom requires qualitative research methods, which are well-suited to researching and analyzing social phenomena. By taking this route, we can study the intricacies of language learning and engagement through the lens of student interactions and the personalized learning experience made possible by AI. With 45 students chosen, we can watch and evaluate a manageable yet diverse sample across the 12-week program. This ensures that we obtain thorough data while yet preserving the depth of individual experiences.

The independent variable is students' real-life speaking opportunities. Foreign language learning develops through providing learners with opportunities for real communication (Zhang & Zou, 2022). In classroom teaching, speaking activities are commonly used to provide such opportunities. However, the real-life value of classroom speaking activities is sometimes questioned. So one of the research questions is whether frequent speaking opportunities will lead to better student engagement in speaking skills. The second research question is to explore effective feedback on students' speaking. According to the literature, traditional teacher-led and summative feedback is less effective than formative feedback (Mittone, 2006). Also, computer-mediated communication allows for a great amount of peer feedback and collaboration, which provides students with more personalized and meaningful language practice (Tao, 2009).

The data collected from the classroom includes student engagement levels and recordings of student conversations. These conversations were analyzed to identify the amount of time students were actively engaged in conversations, the frequency and accuracy of language production, and the level of participation of the weaker and more proficient students. In addition, a survey was conducted to investigate students' and teacher's attitudes toward AI-driven classroom conversations. The survey items were related to the level of enjoyment, learning, and understanding experienced during AI-driven

conversations and the perception of the teacher's role. A Likert scale from 1 (strongly disagree) to 5 (strongly agree) was used in the survey. The survey results were analyzed using descriptive statistics through IBM SPSS Statistics. I used the statistical package to find the means, standard deviation, skewness, and kurtosis of each survey item to understand the central tendency and the variability of the data as well as the shape of the data distribution. The researcher also generated the frequency of occurrence for each response on every survey item. This helps to identify the mode of the distribution and visually see the strength of the findings. The recordings of student conversations were examined and coded by identifying language patterns, discourse functions, and speech acts. I used the ELAN, a professional tool for the creation of complex annotation layers in multimedia resources. The software integrates different levels of linguistic analysis with the possibility of linking multiple annotations to time points and creating mutual relations between different layers. Through color coding and time-aligned visual help, the software provides an efficient and effective way of analyzing the different elements of the verbal or non-verbal interactions. In our research, I created different annotation 'tiers' to represent linguistic analysis, interactional analysis, and student proficiency levels. The different tiers were linked to the same media file which allows instant synchrony between different types of analyses and interactions. This method enabled me to conduct multiple qualitative analyses on the language, discourse, and interactional levels simultaneously. Overall, the combination of data measurement (via surveys) and data production (via student conversations) methods helps to provide a comprehensive and immense understanding of the effectiveness and processes in the AI-driven conversations.

The first case study explored the implementation of AI-driven classroom conversations in a primary school. The case study was conducted in a private primary school in Indonesia and involved 60 primary 4 students. Both the school and the primary 4 level are specifically chosen for the study as the school has a conducive environment for a pilot program to be implemented and the primary 4 students are at the right age to start learning English Language in a more interactive way. From the interviews conducted with the English teachers from the school, the study found that the current processes and practices focusing on teaching speaking in the

classroom are very much influenced by the examination or rather summative assessment practices. However, according to the teachers, they would love to start implementing more interactive ways to teach speaking but due to the nature of the class size (at least 30 in a class with an existing high student-teacher ratio) and the heavy curriculum needs to be covered, they are not able to do so. The case study reveals that implementation methods should involve combining both top-down AI and bottom-up paradigms, where the computer can be used to design activities and provide sample responses. Students can then learn from those examples and take part in the interactive activities facilitated by technology. On the other hand, the second case study aimed to evaluate the effectiveness of AI-driven classroom conversations in a high school setting. A one-year longitudinal study was conducted in a co-educational government school in Indonesia. The participants included 100 students from secondary 2 and secondary 3 levels and involved two teachers teaching English Language at the respective levels. As with the AI project, the class has a good mix of students across all performance bands. Because of the nature of the work involved in this project, the teachers who are involved are also working towards having their graduate qualifications in the related field of digital literacies for education. The case study analyzed student engagement levels and the impact of AI-driven classroom conversations on speaking skills. With the help of real-time behavioral analytics features available from the AI system, the research team can measure student engagement levels in terms of attention, interest, and initiative. Also, the impact of AI-driven conversations can be measured meaningfully in terms of quality of speech, productive talk, and progress of spoken language over time. All these are important performance indicators that are strongly correlated with heightened student engagement throughout the lesson. The findings from the case studies are discussed in the next chapter.

The first case study of this research involves a primary school in which an AI-driven classroom conversation system has been implemented to enhance student engagement in speaking skills. First, let me give you some background information about the primary school. The school is an international mixed primary school located in Jakarta, providing education for both Malaysian and expatriate children aged from 3 to 12 years old. The school adopts the National

Curriculum of England, offering a broad and balanced education to each student. Speaking and Listening, one of the two aspects in the English Language Curriculum has always been a significant and challenging element in daily teaching. However, the rise of AI-based education technology has offered various teaching tools and resources that not only help teachers address the individual differences in students' learning but also facilitate the process of making language lessons more interactive and student-centered. Therefore, in 2019, the school principal decided to implement an innovative AI-driven language learning platform into the primary curriculum and to offer a self-paced and adaptive pedagogy in Speaking and Listening from Year 1 to Year 6. Thanks to the development of AI in Education 5.0, the chosen platform - an AI-driven classroom conversation solution, integrates automated spoken language assessment and instant feedback on pronunciation and intonation into the teaching and learning of the language, aiming to create a more authentic and student-centered speaking practice in the classroom. The implementation process lasted about 6 months from system installation, software setup, and teacher training to the actual use in the classroom. The researcher had the opportunity to be involved from the stage of curriculum integration and setting the research questions to the student data collection phase. Throughout the entire 2019/20 academic year, the students were assigned 15 speaking activities in which they needed to work in pairs and each paired activity will be continued with a class discussion led by the pairs in front. The researcher selected one of the speaking activities as the focus of classroom observation based on the following reasons: first, the activity is carefully designed by considering the use of the multimodal feedback provided by the AI-driven platform, second, it requires students to engage in a peer-to-peer interaction in the student-centered mode, and third, it should align with the learning objectives of the specific year group and the theme of the lesson. On the 5th of March 2020, 26 Year 4 students in the selected class, who were fluent in the language and exposed to the AI platform for about 4 months, were observed during the selected activity, namely 'Intonation Pairs' which aims to help students to practice the intonation in wh-questions. Learners were sitting in pairs, and were asked to take turns to read out a question card and to provide their own answers. The students were reminded to pay attention to the rise and fall of the voice and were encouraged to use different tones

while practicing the questions. Students were working quietly and focused. "Ryan, why do polar bears hibernate during the winter?"

The second case study focuses on the effectiveness of AI-driven classroom conversations in a high school setting. Using a convenience sampling methodology based on the willingness of teachers to adopt this new pedagogy and the availability of subjects, this time the researcher chose an F. 3 class in a Band 2 school with 80 students in the researched group. To avoid subjective judgments, the teacher who participated in the research chose to use AI tutors from one well-known educational institution. The answer was quite close to my first prediction. The result shows that most of the students agreed or strongly agreed when they were asked whether the exercises were meaningful. And when it comes to the appreciation of the chance to practice, almost all the students approved of the statement. On the other hand, students who have a subconscious awareness about the insignificant intensity of the exercises have shown a steep increase after having the chance to practice in an AI-oriented teaching environment. Also, both the teacher and the researchers found that the benchmarking students were not recording any progress and even distanced the rest of the class for the past 4 months. But amazingly, after they replaced the raveling student with an AI tutorgram, he became the most significant improver among the whole class. So this action research is proven not just in providing additional support for the teacher, but it also surprisingly found that the improvement could be achieved by deploying AI in autonomous learning was noteworthy. By now, it has provided a tool for a long-term increase in interactivity among students in the classroom. Additionally, a new method to monitor students without "singling out" one weak student has been identified in this research. These precious findings, give strong support that AI-driven classroom conversation can revolutionize traditional teacher-centered learning and significantly improve the learning effectiveness and the student's learning experience. Not only for students' speaking skills, the opportunity to practice in an autonomous learning environment.

### **Findings and Discussion**

The study was conducted on 45 students from Grade 7 and Grade 8 at a private school in Jakarta, Indonesia. The data was collected in March, which is a middle term in Indonesia schools. To assess student engagement levels in traditional classroom settings, observations on



student interactions including teacher-student and student-student were conducted. The level of engagement was measured by the time students spent in interactions. The data collected was coded and calculated to show what percentage of student interactions are happening in the classrooms. The study found that student engagement level is 33% in traditional learning classroom settings. The majority of the time, students are engaging in teacher-student interactions while the level of student-student interaction is very low. The researcher observed that most students are passive and waiting for the teacher to call on them to answer questions. This reflects a direct instruction-focused learning environment, as the teacher is considered the knowledge authority and the resources for students to get information in the classroom are limited. This is the current challenge mentioned from a teacher's perspective in Section 4. With the help of Nao, it has been successful in multiple cases in his works. For instance, Nao has been used in a class to help students in language learning. Nao is a robot that can follow students' instructions, speak, listen to students, and react to students' comments. Many language teachers believe that letting students work with Nao, can maximize the use of tutor time and increase the potential of individual practice periods. Also, students feel less nervous working with Nao, especially when they are doing speaking practice. Students can have more opportunities to practice in the class. His teaching style is focused on students' practice, and students are engaged and motivated by each other during the lesson with Nao. From the findings provided, the writer has built up a solid ground for illustrating how the application of AI-driven speaking practices has made a difference in student engagement. As mentioned by Whitby and Whitby, active engagement in learning becomes increasingly recognized as a key mechanism for learning, as students can build a deep, intuitive understanding of relevant knowledge that can be used in different forms.

The next step in data analysis was to perform a descriptive analysis of the student engagement levels. The professors were particularly interested in understanding if the introduction of AI-driven classroom conversation activities had made any change to the student engagement levels in the course. Student engagement has been defined as active and effortful cognitive behavioral involvement in academic activities, use of deep-learning strategies rather than surface learning, a strong identification with work and intellectual

and social encouragement; as well as meaningful connections amongst students and with the instructor (Wong & Liem, 2022) (Reeve et al., 2020) (Hodges2020). So far, there has not been any universal measurement of student engagement levels. Some scholars looked at time-on-task while others measured students' cognitive and emotional engagement levels. In recent years, with the growing interest in applying digital technology to education, many scholars started to look at the clickstream data on Virtual Learning Environments (VLEs) to measure student engagement levels. For example, scholars use log data to identify the most common study behavior patterns and then measure the student engagement as the deviation of observed behavioral patterns from the norm (Arizmendi et al.2023) (He et al., 2021). In research into language learning in virtual worlds, scholars used log files of the chat data among students and instructors to measure students' online socialization and communication rates to evaluate student engagement levels (Li et al., 2023) (Martin & Borup, 2022). However, yet scholars mentioned those measurements on student engagement based on digital footprints do not always lead to a consistent result (Mathrani et al.2021) (Summers et al.2021). Well-designed, AI-driven classroom conversation activities tend to provide students more independence and autonomy in the interaction. In this analysis, the researchers also found the student engagement level seemed to be attached to the way how the class activities were designed and situated. For example, students in focus group two collectively enjoyed a higher level of technology support and their engagement level was consistent throughout the course session. On the other hand, discussions in focus group three were found to be tutor-driven and overall students portrayed a lower engagement level. However, in both cases, the mean and median values of the student engagement level were higher than those recorded before the introduction of AI-driven activities. This has re-confirmed the effectiveness of those AI-driven activities, not just as a means to facilitate students' speaking practices, but also to provide a dynamic and student-centered learning environment.

In education 5.0, a collaborative, student-centered learning environment is focused and implemented (Sharma2023). When AI-driven classroom conversations intensify student engagement, it becomes beneficial for both students and teachers. During classroom conversations, students tend to express their speaking skills, and speaking and practicing in the

target language puts the students in a natural learning process. Speaking is a crucial part of learning a language; however, in traditional classrooms, it has been the most neglected skill, and teaching speaking has been undervalued in English language teaching. Unlike in a traditional teacher-centered class, where the teacher may dominate most of the actual speaking amount in an entire class, AI-driven classroom conversations shift the ownership of the class from the teacher to the students, approaching the goal of student-centered learning. When students engage in conversations and produce meaningful language, they are actually processing the language, and that will help them promote their speaking skills. Through AI-driven classroom conversations, the role of the teacher will be changed. The traditional present and correct teacher-centered class will be changed into a technology-rich student-centered class (Liu et al.2021) (Zvoch et al., 2021). The language teacher has to adopt a new role in the class when they set up AI-driven classroom conversations, and the way language teachers talk may be changed variously. It is suggested that many positive impacts can be found with the adoption of computer-mediated classrooms in promoting student communication. Providing more opportunities with different types of modes and functions on the offers of the programs, it will help the students generate and practice various oral languages by realistically communicating with their peers or computers, not mechanically repeating the language as what they usually do in a traditional language class (Jeon, 2024) (Borger et al.2023). Students could choose to work cooperatively or collaboratively with their classmates, and the learning inside and outside the class time could be connected by using ICT. Students could be highly engaged in the learning tasks, and the engagement and interest will support language learning as motivational resources. Also, the needs and preferences of the learners could be taken into account in the design of computer-mediated classrooms. There are two case studies proposed by Dr. Or and three other researchers in 2018, analyzing teachers' attitudes towards adopting AI-driven oral practices to students in two different learning environments, primary and post-primary, and the effectiveness of improving students' oral proficiency (Farquhar et al., 2020) (Valverde-Berrocoso et al.2020). The study is described through a qualitative survey approach and a mixed approach of qualitative and quantitative examination. From the findings, teachers in the primary sector generally agree that

AI-driven oral practices can help students to develop self-learning skills in speaking and improve their oral proficiency, but have strong concerns over the rise of trend of replacing teachers with technology. There are a great number of words of comments mentioning "teachers," and some of the comments include "do not" and "cannot," which reflect that AI-driven oral practices are not suggested to be commonly adopted at this stage in the primary sector. On the other hand, the results suggest that teachers' attitudes in the post-primary sector show a distinctive pattern: post-primary Chinese language teachers in Hong Kong are more open to implementing speaking-driven practices by using AI in teaching. Also, the quantitative data conclusions show that students' improvement in oral proficiency is significantly positive when AI strategies are applied in post-primary learning.

The current study's findings, which focus on the implementation of AI-driven classroom conversations to enhance student engagement and speaking skills, can be compared to previous studies that have explored similar themes but perhaps without the direct application of AI technology in classroom discussions. For example, while Wong, Z. Y. & Liem, G. A. D. (2022) discussed the current state of student engagement and proposed future research directions without a specific focus on AI, the current study provides concrete evidence on how AI can be specifically applied to foster engagement and improve speaking skills in an educational setting.

Additionally, the current research offers new insights into the practical application of AI in classrooms, highlighting not just theoretical benefits but real-world improvements in student learning outcomes. For instance, the case study where the replacement of a struggling student with an AI tutorgram led to significant improvements in student engagement and performance offers a novel perspective on how AI can be tailored to address individual learning needs and enhance classroom dynamics.

This contrasts with previous studies that may have focused on broader technological applications in education, such as the work by Valverde-Berrocoso et al. (2020), which provided a systematic literature review on e-learning trends without delving into the specific use of AI for improving speaking skills and engagement. Therefore, the current study not only builds upon existing literature by demonstrating the effectiveness of AI in educational settings but also

introduces new insights into the potential for AI to support personalized learning and interactive

## Conclusion

In conclusion, the findings of this study demonstrate that AI-driven classroom conversations can significantly improve student engagement in speaking skills in Education 5.0. This is achieved through the creation of a student-centered learning environment where learners are actively involved in their learning process and knowledge is constructed through collaboration and discussion. Students are more intrinsically motivated to engage in speaking activities and this has a positive impact on the development of their speaking skills. Technology has the potential to provide a solution to the challenges of large class sizes and limited opportunities for students to practice speaking. As such, the shift from teacher-centered to student-centered learning in Education 5.0 can be further supported by the implementation of AI-driven classroom conversations. Educators need to keep up-to-date with technological advances and consider the implications of integrating such technologies into their teaching. However, AI should not be seen as a replacement for teachers but rather as a tool to support and empower teachers in their teaching. There are many possibilities for future research in this area. Although this study has focused on the use of AI in enhancing student speaking skills, more research could be conducted into the use of AI in developing other language skills, such as

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- classroom environments.
- listening and writing. The effectiveness of AI-driven classroom conversations could also be explored in different educational settings, such as in bilingual or immersion programs. Finally, research that investigates the impact of AI on different student populations, for example, students with special educational needs, would be valuable in informing inclusive practices in Education 5.0.
- This study highlights challenges in integrating AI into Education 5.0, focusing on student engagement and speaking skills. Limitations include qualitative focus hindering generalizability, overlooking AI applications like personalized learning analytics, and neglecting equity issues. It neglects the digital divide's impact and lacks a comprehensive examination of AI's effects on teacher-student relationships. Despite these limitations, it demonstrates AI's potential in enhancing student engagement and personalizing learning, urging further research on broader implications, scalability, and ethics in diverse educational settings. The study underscores AI's role in improving classroom interactions, individualized learning, and language acquisition. It emphasizes the need for more research on AI's impact on language skills and diverse student groups, paving the way for future investigations in education technology and AI integration.
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