

INNOVATION IN AI-BASED SPEAKING INSTRUCTION THROUGH DIGITAL LITERACY SCAFFOLDING FOR STRENGTHENING ACADEMIC COMMUNICATION COMPETENCE IN THE SOCIETY 5.0 ERA

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Abstract

The rapid development of Artificial Intelligence (AI) has transformed higher education learning systems, particularly speaking instruction in the Society 5.0 era. University students still face challenges in academic communication, including low speaking confidence, weak argumentation skills, limited critical thinking, and inadequate digital literacy. This study aimed to describe the implementation of AI-based speaking instruction through digital literacy scaffolding to strengthen students' academic communication competence in the Indonesian Language and Literature Education Program at IKIP PGRI Bojonegoro. This research employed a descriptive qualitative approach involving 37 students. Data were collected through participatory observation, in-depth interviews, documentation, and analysis of students' speaking performances. Data were analyzed interactively through data reduction, data display, and conclusion drawing. The findings revealed that AI integration created a more communicative, adaptive, and reflective learning environment. Students used AI to develop presentation frameworks, improve academic arguments, conduct speaking simulations, and evaluate speaking performances independently. The implementation of digital literacy scaffolding also encouraged students to utilize digital technology critically and ethically. The results demonstrated improvements in several aspects of academic communication competence, including speaking confidence (54%–86%), academic argumentation (49%–83%), presentation fluency (57%–88%), critical thinking (51%–81%), and academic digital literacy (46%–90%). Furthermore, AI-assisted learning enabled lecturers to provide more adaptive and efficient feedback through technology-supported evaluation. This study concludes that AI-based speaking instruction through digital literacy scaffolding effectively strengthens students' academic communication competence and digital literacy in higher education learning transformation.

Keywords: artificial intelligence, speaking instruction, digital literacy scaffolding, academic communication, Society 5.0

Introduction

The transformation of education in the Society 5.0 era has encouraged the integration of digital technology and Artificial Intelligence (AI) into learning processes in higher education. The concept of Society 5.0 positions humans as the center of technological innovation by utilizing AI to solve various social and educational problems adaptively and sustainably. In the context of language

education, the utilization of AI has become a strategic approach to improving the quality of speaking instruction that is more interactive, personalized, and communicative. According to Longhui Yu and colleagues (2024), the integration of AI in language learning can enhance student engagement through automated feedback, communication simulations, and data-based speaking performance evaluation. This indicates that AI is no longer

positioned merely as a supporting tool, but rather as a learning ecosystem that supports the strengthening of twenty-first-century competencies.

Academic speaking competence is an essential skill for students in the Indonesian Language and Literature Education Program because it is directly related to the ability to deliver scientific ideas systematically, argumentatively, and communicatively. However, various studies reveal that university students still experience difficulties in academic speaking skills, particularly in terms of self-confidence, argumentative structure, mastery of digital media, and critical communication abilities. According to Neil Mercer and Dawes (2023), speaking instruction in higher education still tends to be conventional, causing students to have limited dialogic opportunities that support the optimal development of academic communication. Similar conditions were also found among students of the Indonesian Language and Literature Education Program at IKIP PGRI Bojonegoro, who became the subjects of this study, where some students tended to be passive during academic discussions, lacked confidence during presentations, and had not optimally utilized digital technology as a medium for scientific communication.

The development of AI in education provides new opportunities for lecturers to develop technology-based speaking instruction. According to Wayne Holmes (2022), AI is capable of providing adaptive learning through real-time analysis of student performance, making the learning process more personalized and reflective. In speaking instruction, AI can be utilized to help students conduct presentation simulations, practice academic communication, and obtain automated feedback related to articulation, language structure, and argumentative quality. The use of AI becomes increasingly relevant when combined with a digital literacy

scaffolding approach that emphasizes assisting students in using technology critically, ethically, and productively.

The concept of scaffolding developed by Jerome Bruner emphasizes the importance of gradual assistance in the learning process so that learners can achieve competence independently. In the context of digital literacy, scaffolding is not only related to technical abilities in using technology, but also to the ability to understand, evaluate, and produce digital information critically. According to Henry Jenkins (2020), digital literacy has become a fundamental competence in twenty-first-century education because students are required to communicate and collaborate effectively through various digital platforms. Therefore, the integration of AI and digital literacy scaffolding in speaking instruction is considered capable of creating a more collaborative, communicative, and reflective learning environment.

Previous studies have revealed the effectiveness of AI in language learning. Research conducted by Xiaoming Zhai et al. (2021) showed that AI can improve students' learning motivation and the quality of interaction in digital language learning. Another study by Fang Zhao (2023) explained that the use of conversational AI can significantly improve students' academic communication competence. Nevertheless, studies specifically examining the integration of AI through the digital literacy scaffolding approach in speaking instruction at Indonesian universities are still relatively limited. Most previous studies have focused more on technological aspects, while pedagogical dimensions, digital literacy, and academic communication have not been explored comprehensively.

Based on these conditions, this study is important to address the need for the transformation of speaking instruction in the Society 5.0 era. This research focuses on the implementation of AI-based

speaking instruction through digital literacy scaffolding to strengthen the academic communication competence of students in the Indonesian Language and Literature Education Program at IKIP PGRI Bojonegoro, consisting of 37 students. This study employed a descriptive qualitative approach through participatory observation, in-depth interviews, documentation of digital learning activities, and analysis of students' speaking performances. The novelty of this study lies in the development of an AI-based speaking instruction model that integrates adaptive technology with the strengthening of digital literacy and academic communication in an integrative manner. Therefore, the findings of this study are expected to contribute both theoretically and practically to the development of technology-based language learning in higher education in Indonesia.

Method

This study employed a descriptive qualitative approach aimed at describing in depth the implementation of Artificial Intelligence (AI)-based speaking instruction through digital literacy scaffolding in strengthening the academic communication competence of students in the Indonesian Language and Literature Education Program (PBSI) at IKIP PGRI Bojonegoro. A qualitative approach was selected because this study focused on understanding learning phenomena naturally, contextually, and interpretatively according to real conditions within the classroom environment. According to John W. Creswell (2018), qualitative research enables researchers to understand meanings, experiences, and social interactions occurring in educational processes more comprehensively.

The research subjects consisted of 37 PBSI students of IKIP PGRI Bojonegoro who attended the academic speaking course during the even semester of the 2025/2026 academic year. The participants were

selected purposively by considering their active involvement in digital technology-based learning and the use of AI in academic activities. In addition to students, the course lecturer was also involved as a supporting informant to obtain data regarding instructional strategies, digital scaffolding processes, and AI-based learning evaluation.

Data collection was conducted through several techniques, namely participatory observation, in-depth interviews, documentation, and analysis of students' speaking performances. Participatory observation was carried out throughout the learning process to observe student interactions, the use of AI platforms, academic communication patterns, and the implementation of digital literacy scaffolding. In-depth interviews were conducted with students and lecturers to obtain information related to learning experiences, perceptions of AI utilization, learning obstacles, and changes in academic communication competence. Documentation in the form of presentation recordings, digital assignments, students' reflective notes, and online learning activities was utilized to strengthen the validity of the research data. In addition, speaking performance analysis focused on argumentative ability, communication fluency, self-confidence, and students' ability to utilize digital media critically and ethically.

The primary instrument in this research was the researcher as the human instrument, supported by observation guidelines, semi-structured interview guidelines, and academic speaking performance analysis sheets. Data validity was examined through source triangulation, technique triangulation, and member checking to ensure the credibility and consistency of the findings. According to Norman K. Denzin (2017), triangulation is an important strategy in qualitative research to enhance the validity of data interpretation through

multiple sources and data collection techniques.

Data analysis was conducted interactively using the model proposed by Matthew B. Miles, Huberman, and Saldaña, which included the stages of data reduction, data display, and conclusion drawing carried out continuously throughout the research process. During the data reduction stage, the researcher selected and categorized data based on the focus of the study, namely AI implementation, the digital literacy scaffolding process, and the strengthening of students' academic communication competence. Data presentation was carried out in the form of descriptive narratives, matrices, and thematic categorization to facilitate interpretation. Finally, conclusions were drawn reflectively by connecting field findings with theories of technology-based learning, digital literacy, and academic communication in the Society 5.0 era.

Results & Discussion

This study was conducted among 37 students of the Indonesian Language and Literature Education Program at IKIP PGRI Bojonegoro. The research focused on the implementation of Artificial Intelligence (AI)-based speaking instruction through a digital literacy scaffolding approach in strengthening students' academic communication competence in the Society 5.0 era. The research data were obtained through participatory observation during the learning process, in-depth interviews with students and lecturers, documentation of digital learning activities, and analysis of students' academic speaking performances.

Based on the initial observations, it was found that most students still experienced various obstacles in academic communication. These challenges included low self-confidence in speaking in front of the class, difficulties in organizing scientific arguments systematically, limited critical thinking skills in academic

discussions, and minimal utilization of digital technology as a medium for speaking instruction. These conditions were evident during the initial stage of the research when students delivered academic presentations. Some students still relied heavily on reading presentation texts, were unable to answer discussion questions argumentatively, and demonstrated ineffective verbal communication.

After the implementation of AI-based speaking instruction through digital literacy scaffolding, significant changes were identified in students' academic communication patterns. The scaffolding process was carried out through guided assistance in using AI for preparing presentation frameworks, conducting digital speaking simulations, evaluating communication performance, reflecting on learning outcomes, and developing scientific arguments through digital technology. Students were directed to utilize AI critically and ethically so that technology was not merely used to obtain instant answers but also functioned as a medium for developing thinking and academic communication skills.

Table 1. Initial Condition of Students' Academic Communication Competence

No	Competency Aspect	Number of Students Experiencing Difficulties	Percentage
1	Speaking confidence	21 students	57%
2	Academic argumentation	24 students	65%
3	Presentation fluency	19 students	51%
4	Critical thinking ability	22 students	59%
5	Academic digital literacy	26 students	70%

Based on Table 1, academic digital literacy was identified as the weakest aspect in the initial stage of the study, with a difficulty percentage of 70%. Students were not yet accustomed to using digital technology as a productive and critical medium for academic communication. In addition, academic argumentation skills were also relatively low because students tended to express opinions descriptively without strong scientific reasoning.

The implementation of AI in speaking instruction was conducted through several stages. In the first stage, students utilized AI to assist them in preparing academic presentation frameworks. AI was used to develop main ideas, organize material structures, improve academic diction, and provide alternative argument development. In the second stage, students conducted AI-based speaking simulations through digital presentation practices and academic conversations. The third stage involved speaking performance reflection, in which students evaluated their presentation results based on AI-generated feedback and lecturer guidance.

Table 2. Forms of AI Implementation in Speaking Instruction

No	Learning Activity	AI Implementation	Impact on Students
1	Presentation preparation	AI assisted in creating presentation frameworks	More systematic materials
2	Argument development	AI provided alternative ideas and supporting data	More critical arguments
3	Speaking simulation	AI was utilized for communication practice	Increased self-confidence
4	Learning reflection	AI assisted in evaluating speaking performance	Reduced communication errors
5	Digital literacy	Students used AI ethically and critically	Improved technology utilization

The research findings demonstrated that the use of AI positively influenced the improvement of students' academic communication quality. Students became more active in classroom discussions and more confident in delivering academic presentations. Based on interview results, students stated that AI helped them understand academic communication structures more clearly. They found it easier to organize presentation ideas because AI provided systematic recommendations for developing presentation frameworks.

In addition, AI also contributed to the improvement of students' critical thinking abilities. During academic discussions, students gradually became capable of presenting more logical and data-driven arguments. This condition indicates that AI-based instruction not only improves technical speaking skills but also strengthens students' academic thinking quality. The findings reveal that AI can

function as a reflective learning medium that helps students understand academic communication processes more deeply.

Table 3. Improvement of Students' Academic Communication Competence

No	Competency Aspect	Before AI Implementation	After AI Implementation
1	Speaking confidence	54%	86%
2	Academic argumentation	49%	83%
3	Presentation fluency	57%	88%
4	Critical thinking ability	51%	81%
5	Academic digital literacy	46%	90%

Based on Table 3, all aspects of students' academic communication competence improved after the implementation of AI-based speaking instruction. The highest improvement occurred in academic digital literacy, which increased from 46% to 90%. This finding indicates that students became more capable of utilizing digital technology effectively and responsibly as a medium for academic communication. Meanwhile, presentation fluency increased to 88% because students were provided with more intensive communication practice opportunities through AI-based simulations.

Observation results also revealed that the classroom atmosphere became more interactive and collaborative. Students became more active in asking questions, participating in discussions, and responding to their classmates' presentations. Prior to the implementation of AI, classroom learning tended to be lecturer-centered, limiting students' academic interaction. However, after AI integration, students became more independent in exploring learning materials and communicating ideas effectively.

The digital literacy scaffolding approach became a crucial factor in the successful implementation of AI-based learning. Lecturers not only provided training in technology utilization but also gradually guided students regarding ethical AI use, digital information validation, and technology-based academic communication development. Students were encouraged to continue engaging in

critical thinking processes and not become fully dependent on AI-generated outputs. Therefore, AI functioned as a competency development medium rather than a replacement for students' thinking processes.

The findings of this study are consistent with the research conducted by Wayne Holmes, which stated that AI can create adaptive learning through real-time analysis of learning performance. In addition, this study also supports the perspective of Henry Jenkins that digital literacy is a fundamental competency in twenty-first-century education that must be developed through collaborative and reflective learning.

From a pedagogical perspective, the implementation of AI also assisted lecturers in conducting learning evaluations. Lecturers were able to identify students' weaknesses in academic communication aspects more quickly through technology-based speaking performance analysis. This condition made the evaluation process more objective, adaptive, and efficient. Lecturers also found it easier to provide individualized feedback according to students' needs.

Overall, the research findings indicate that AI-based speaking instruction through digital literacy scaffolding is capable of creating a more communicative, innovative, and humanistic learning environment. The integration of AI in learning not only improves students' speaking skills but also strengthens critical thinking abilities, digital literacy, and academic communication as part of twenty-first-century competencies in the Society 5.0 era. Therefore, this instructional model can become a strategic alternative for transforming language education in Indonesian higher education institutions.

Conclusions

Based on the findings of this study, it can be concluded that the implementation of Artificial Intelligence (AI)-based speaking instruction through a digital literacy scaffolding approach significantly improved the academic communication competence of students in the Indonesian Language and Literature Education Program at IKIP PGRI Bojonegoro. The integration of AI in learning positively contributed to the improvement of speaking confidence, academic argumentation skills, presentation fluency, critical thinking abilities, and students' digital literacy within the context of twenty-first-century learning in the Society 5.0 era.

The findings revealed that AI assisted students in organizing presentation materials more systematically, developing scientific arguments logically, and reflecting independently on their speaking performances. Through technology-based communication simulations, students obtained more interactive, adaptive, and communicative learning experiences, resulting in increased academic participation during the learning process. Furthermore, the digital literacy scaffolding approach implemented gradually by lecturers successfully developed students' abilities to utilize digital technology critically, ethically, and productively.

This study also demonstrated that AI does not replace the lecturer's role in learning; instead, it strengthens lecturers' functions as facilitators, mediators, and mentors in technology-based instruction. AI implementation helped lecturers provide more adaptive and efficient evaluations through objective analysis of students' academic communication performance. Therefore, AI-based speaking instruction through digital literacy scaffolding can serve as an innovative model in transforming language education in higher education institutions.

Overall, this study produced an AI-based speaking instruction model oriented toward strengthening students' academic communication competence and digital literacy. This instructional model is highly relevant to the needs of higher education in the Society 5.0 era because it integrates technology, communication skills, critical thinking abilities, and digital literacy comprehensively. Therefore, this study is expected to contribute both theoretically and practically to the development of technology-based language learning in Indonesia.

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