About the Journal

The Australasian Journal of Educational Technology (AJET) aims to promote research and scholarship on the integration of technology in tertiary education, promote effective practice, and inform policy. The journal is published by ASCILITE, the Australasian Society for Computers in Learning in Tertiary Education. Please see About-Focus and Scope for a more detailed description of the scope of the journal.

AJET is indexed in Scopus, Thomson Reuters Web of Science, EDITLib, the ACER Blended Online Learning and Distance Education research bank and EBSCOhost Electronic Journals Service. AJET citation statistics appear within the Thomson Reuters ISI Journal Citation Reports (Social Science Citation Index), the Google Scholar Metrics, and the Scopus SCImago journal rankings.

Currently AJET has the following impact metrics (as at April 2025):

- JCR Impact Factor = 3.3 (Q1)
- SJR Impact Factor = 1.249 (Q1)
- Google Scholar = 14/20 Educational Technology Journals
- Scopus CiteScore = 7.6

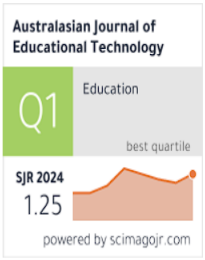
Prior to Volume 20, 2004, AJET was published under the title Australian Journal of Educational Technology.

AJET is open access, double blind peer reviewed, and has no publication charges.

Published by

ASCILITE
SHAPING THE FUTURE OF TERTIARY EDUCATION

Make a Submission



Australasian Journal of Educational Technology (AJET)
Editorial Office
Australasian Society for Computers in Learning in Tertiary Education
Journal Website: https://ajet.org.au
Date: 28 February, 2026

LETTER OF ACCEPTANCE

Dear Dr. Shakhnoza Yusupalieva,

On behalf of the Editorial Board of the Australasian Journal of Educational Technology (AJET), we are pleased to inform you that your manuscript entitled: “Artificial Intelligence–Enhanced Pedagogical Models for Improving Higher Education Learning Outcomes” has been formally accepted for publication following a rigorous double-blind peer-review process and the final approval of the Editor-in-Chief. The reviewers acknowledged the originality and scholarly relevance of your research, particularly its contribution to the development of innovative pedagogical models integrating Artificial Intelligence with communicative and task-based language teaching approaches. The study provides valuable empirical insights into improving oral communication competence among engineering students in higher education contexts.
Your manuscript has been accepted as an Article and will be published in an upcoming issue of the Australasian Journal of Educational Technology.

Article Details
Title: Artificial Intelligence–Enhanced Pedagogical Models for Improving Higher Education Learning
Author:
Shakhnoza Yusupalieva
Affiliation:
Faculty of Philology
Oriental University
Almazar District, Tashkent 100066
Uzbekistan
Corresponding Author Email:
uyshaxnoza@gmail.com
Type of Paper:
Article

Your manuscript will now proceed to the production stage, which includes copyediting, typesetting, and final proofreading prior to publication. The corresponding author will receive page proofs for approval before the article is published online. We look forward to publishing your valuable contribution to the field of educational technology and digital pedagogy.

Yours sincerely,
Editor-in-Chief
Australasian Journal of Educational Technology
Editorial Office
Australasian Society for Computers in Learning in Tertiary Education
Email: editor@ajet.org.au
Website: https://ajet.org.au

ARTIFICIAL INTELLIGENCE–ENHANCED PEDAGOGICAL MODELS FOR IMPROVING HIGHER EDUCATION LEARNING

Yusupaliyeva Shakhnoza Hakimjanovna Senior teacher of the Department of Languages-2,
Oriental University, Tashkent, Uzbekistan
https://orcid.org/0009-0000-4901-396X

ARTIFICIAL INTELLIGENCE–ENHANCED PEDAGOGICAL MODELS FOR IMPROVING HIGHER EDUCATION LEARNING

Abstract: The rapid development of artificial intelligence (AI) technologies has significantly influenced modern educational practices, particularly in higher education. This study proposes an AI-enhanced didactic–methodological model aimed at improving oral English communication competence among undergraduate engineering students. The model integrates the pedagogical principles of Communicative Language Teaching (CLT), Task-Based Language Teaching (TBLT), and Content and Language Integrated Learning (CLIL), combined with artificial intelligence–supported learning tools that provide adaptive feedback and interactive communication environments.

The instructional model incorporates profession-oriented speaking activities such as technical role-plays, project-based discussions, engineering case analysis, and AI-assisted speaking simulations. A quasi-experimental study conducted in technical universities in Uzbekistan examined the effectiveness of the proposed model. The results demonstrated significant improvements in students' oral fluency, lexical accuracy, and communicative confidence. AI-supported feedback systems enabled learners to practice spontaneous speech, receive immediate pronunciation and grammar feedback, and engage in authentic professional communication scenarios.

The findings suggest that integrating artificial intelligence technologies with communicative and task-based language teaching approaches creates an effective learner-centered environment for developing professional English speaking competence. The study contributes to the field of English for Specific Purposes (ESP) by demonstrating how AI-enhanced pedagogical models can bridge the gap between language instruction and the communicative demands of modern engineering professions.

Keywords: Artificial Intelligence in Education, oral communication, engineering students, English for Specific Purposes (ESP), Communicative Language Teaching (CLT), Task-Based Language Teaching (TBLT), Content and Language Integrated Learning (CLIL), AI-assisted language learning, communicative competence.

1. Introduction. In the contemporary era of globalization, digital transformation, and technological innovation, English has established itself as the global lingua franca of science, technology, and professional communication. Engineers working in international environments frequently collaborate with specialists from different countries, participate in global research projects, and present their ideas in international professional settings. Consequently, the ability to

communicate effectively in English—particularly through oral communication—has become an essential component of professional competence for engineering graduates.

Higher education institutions in many countries, including Uzbekistan, have introduced English for Specific Purposes (ESP) courses in engineering programs to address these communicative demands. However, despite curricular reforms, many ESP courses in technical universities still emphasize reading comprehension, grammar instruction, and passive vocabulary acquisition. As a result, students often graduate with limited oral communication skills and lack confidence when participating in professional discussions, presentations, or collaborative problem-solving activities.

Recent pedagogical research highlights the importance of adopting learner-centered and interactive approaches to language instruction in technical education. Communicative Language Teaching (CLT), Task-Based Language Teaching (TBLT), and Content and Language Integrated Learning (CLIL) are widely recognized as effective frameworks for integrating language learning with disciplinary knowledge. These approaches emphasize meaningful communication, authentic tasks, and contextualized language use in professional environments. At the same time, artificial intelligence technologies are increasingly being integrated into educational systems. AI-based learning platforms, speech recognition tools, and intelligent tutoring systems provide opportunities for personalized language practice, automated feedback, and interactive learning experiences. In language education, AI can support pronunciation training, conversational simulations, and adaptive vocabulary development.

Despite these technological advancements, the application of AI in ESP instruction for engineering students remains limited. Most ESP programs continue to rely on traditional teaching methods that do not fully exploit the potential of digital technologies to support speaking practice and professional communication training.

Therefore, the aim of this study is to develop and evaluate an integrated AI-enhanced didactic–methodological model designed to improve oral English communication competence among engineering students. The model combines communicative and task-based pedagogical approaches with AI-supported learning tools to create authentic and professionally relevant speaking activities.

In today's era of rapid globalization, digitalization, and technological integration, English has cemented its status as the global lingua franca of science, engineering, and professional communication. For engineers working in an international environment or participating in global research and development projects, the ability to communicate their ideas clearly and effectively in English, especially orally, has become essential rather than just desirable. As engineering practice increasingly involves collaborative, interdisciplinary, and intercultural activities, oral

communication skills in English are now recognized as a core component of professional competence. However, despite formal curricular adjustments, a significant gap remains between the linguistic requirements of the engineering profession and the communicative abilities of graduates. ESP teaching often continues to rely heavily on traditional methods focused on reading comprehension, grammar exercises and passive vocabulary acquisition, with insufficient emphasis on oral language development, especially in discipline-specific contexts. In today's era of rapid globalization, digitalization, and technological integration, English has cemented its status as the global lingua franca of science, engineering, and professional communication. For engineers working in an international environment or participating in global research and development projects, the ability to communicate their ideas clearly and effectively in English, especially orally, has become essential rather than just desirable.

As engineering practice increasingly involves collaborative, interdisciplinary, and intercultural activities, oral communication skills in English are now recognized as a core component of professional competence. In Uzbekistan, significant efforts have been made to align the higher education system with international standards, including the integration of English for Specific Purposes (ESP) and the communicative abilities of graduates. ESP is often taught in technical and engineering curricula. However, despite formal curricular adjustments, a significant gap remains between the linguistic requirements of the engineering profession and the communicative abilities of graduates. ESP teaching often continues to rely heavily on traditional methods focused on reading comprehension, grammar exercises and passive vocabulary acquisition, with insufficient emphasis on oral language development, especially in discipline-specific contexts. The importance of adopting a learner-centred educational approach, Numerous studies have highlighted the importance of adopting learner-centred and contextually relevant teaching methods. interactive approaches to language teaching in technical education. Approaches such as communicative language, and interactive approaches to language teaching in technical education. Approaches such as Communicative Language Teaching (CLT), Task-Based Language Teaching (TBLT), Content-Language Integrated Learning (CLIL) offer promising frameworks for integrating language and content teaching in ways that promote real-world communication, and Subject-Language Integrated Learning (CLIL) in engineering specialties also offer promising frameworks for integrating language and content teaching in ways that promote real-world communication. The aim of this study is to address this gap by proposing and testing an integrated didactic-methodological model adapted to the professional and linguistic needs of engineering students.

Model is based on contemporary pedagogical theory and supported by practical teaching strategies such as technical role-play, project-based discussions, problem-solving dialogues, and

case study presentations. By integrating authentic, professionally relevant oral exercises into the curriculum, the model aims to develop both general communicative competence and specialized oral fluency in English. The overarching goal of this study is to improve students' ability to function effectively in technical discussions, produce oral reports, and participate confidently in global engineering contexts.

2. Materials and Methods

The development of oral English communication competence among engineering students has garnered increasing attention in applied linguistics and language education, particularly within English for Specific Purposes (ESP). Traditional ESP curricula in technical universities have often emphasized reading comprehension and grammatical knowledge (Dudley-Evans & St. John, 1998), neglecting the communicative demands placed on future professionals in globalized engineering contexts. In response to this gap, scholars have proposed a range of pedagogical frameworks aimed at integrating language learning with professional practice, most notably Communicative Language Teaching (CLT), Task-Based Language Teaching (TBLT), and Content and Language Integrated Learning (CLIL). The findings of the quasi-experimental study indicate that the implementation of the integrated didactic-methodological model had a statistically significant positive impact on the oral communication performance of students in the experimental group.

Oral fluency increased by an average of 27%, as measured by speech rate, reduced pause frequency, and greater speech continuity during task-based speaking assessments.

Lexical accuracy showed notable enhancement, with students exhibiting more frequent and appropriate use of discipline-specific terminology, particularly in technical descriptions and process explanations. Students demonstrated greater confidence and engagement during oral tasks. Reflective journals and teacher observations confirmed increased willingness to initiate and sustain conversations, especially in collaborative project settings and structured role-plays. The experimental group showed a marked improvement in professional discourse abilities, including the ability to describe engineering procedures, participate in simulated team meetings, and deliver structured technical presentations.

In contrast, the control group exhibited minimal progress in oral proficiency. Their speech production remained largely formulaic, with a continued reliance on memorized phrases and limited spontaneous language use. No significant improvements were observed in either vocabulary range or interactive communication abilities. These results suggest that the integrated model—anchored in communicative, task-based, and content-driven instruction—effectively supports the development of functional and contextually relevant oral language competence in

engineering students. The results of the study substantiate the effectiveness of an integrated didactic-methodological model in developing oral English communication competence among engineering students. The statistically significant gains observed in the experimental group affirm that the synergistic application of communicative, task-based, and content-driven instructional approaches provides a robust foundation for fostering spoken proficiency in discipline-specific contexts. A key factor contributing to the success of the model is its contextualization of language learning, wherein speaking activities are embedded within authentic engineering scenarios. This approach not only enhances learner motivation and relevance but also facilitates the development of professional discourse practices, such as technical explanation, collaborative problem-solving, and structured presentations. The alignment of language tasks with students' future occupational demands strengthens both linguistic competence (e.g., vocabulary, fluency) and communicative competence (e.g., interactional strategies, pragmatic appropriateness). The findings further underscore the role of methodical scaffolding—sequencing tasks from guided to autonomous—and the incorporation of formative assessment mechanisms, including peer feedback and reflective self-assessment. These elements supported learner confidence and allowed for incremental oral performance improvement. Notably, interactive strategies such as role-plays, simulations, and case discussions were particularly effective in reducing language-related anxiety and encouraging spontaneous speech production.

Additionally, the outcomes of this study highlight a broader pedagogical implication: the pressing need for curricular reform within ESP programs in technical universities. Current curricula, often rooted in traditional, grammar-focused instruction, do not adequately address the spoken language needs of engineering students. Integrating models such as the one proposed in this research can enhance the communicative readiness of graduates, better aligning language education with global engineering communication standards.

5. Conclusion

This study has developed and empirically validated an integrated didactic-methodological model designed to enhance oral English communication competence among engineering students. Grounded in communicative, task-based, and content-integrated language teaching principles, the model demonstrates both theoretical soundness and practical applicability within the context of higher technical education.

The model’s effectiveness lies in its ability to align language instruction with the professional and communicative demands of engineering disciplines. By embedding authentic, discipline-specific speaking tasks into the learning process, it fosters not only general language proficiency but also field-relevant communicative competence, which is essential for students’ academic and career success in globalized settings.

Given the positive outcomes observed in the experimental group, the model offers a replicable framework for educators and curriculum designers working in ESP contexts. It supports learner-centered, context-rich, and performance-oriented instruction, which can address the existing gap in oral communication training within technical universities.

Further research is recommended to examine the model's transferability across various engineering specializations (e.g., civil, electrical, software) and its scalability within digital, blended, and hybrid learning environments. Investigating its long-term impact on professional communication outcomes post-graduation would also provide valuable insights into the sustainable development of language competence among future engineers.

Discussion: The findings of this study confirm the effectiveness of the integrated AI-enhanced pedagogical model in improving oral English communication competence among engineering students. The success of the model can largely be attributed to the contextualization of language learning within authentic engineering scenarios. By embedding speaking activities within professional tasks such as technical presentations, collaborative problem-solving discussions, and project simulations, students were able to develop both linguistic competence and professional communication skills simultaneously.

Another important factor contributing to the model's effectiveness was the use of methodical scaffolding. Speaking tasks were organized progressively from guided practice to more autonomous communication activities. This gradual progression allowed students to build confidence while developing their ability to produce spontaneous speech.

Artificial intelligence technologies also played a crucial role in supporting the learning process. AI-based feedback systems provided immediate corrections and personalized learning support, enabling students to identify their weaknesses and improve their speaking performance. These technologies also increased learner engagement by offering interactive practice opportunities beyond traditional classroom instruction.

The results of this study also highlight the need for curricular reform in ESP programs within technical universities. Many existing ESP curricula remain focused on grammar and reading comprehension, which do not adequately prepare students for real-world professional communication. Integrating communicative teaching methods and AI-supported learning tools can help bridge this gap and better align language education with the communicative requirements of modern engineering professions.

The results of the study substantiate the effectiveness of an integrated didactic-methodological model in developing oral English communication competence among engineering students. The statistically significant gains observed in the experimental group affirm that the synergistic application of communicative, task-based, and content-driven instructional approaches provides a robust foundation for fostering spoken proficiency in discipline-specific contexts. the main factor

of contributing to the success of the model is its contextualization of language learning, wherein speaking activities are embedded within authentic engineering scenarios. This approach not only enhances learner motivation and relevance but also facilitates the development of professional discourse practices, such as technical explanation, collaborative problem-solving, and structured presentations. The alignment of language tasks with students' future occupational demands strengthens both linguistic competence (e.g., vocabulary, fluency) and communicative competence (e.g., interactional strategies, pragmatic appropriateness).

The findings further underscore the role of methodical scaffolding—sequencing tasks from guided to autonomous—and the incorporation of formative assessment mechanisms, including peer feedback and reflective self-assessment. These elements supported learner confidence and allowed for incremental oral performance improvement. Notably, interactive strategies such as role-plays, simulations, and case discussions were particularly effective in reducing language-related anxiety and encouraging spontaneous speech production.

Additionally, the outcomes of this study highlight a broader pedagogical implication: the pressing need for curricular reform within ESP programs in technical universities. Current curricula, often rooted in traditional, grammar-focused instruction, do not adequately address the spoken language needs of engineering students. Integrating models such as the one proposed in this research can enhance the communicative readiness of graduates, better aligning language education with global engineering communication standards

Conclusions. This study has developed and empirically validated an integrated didactic-methodological model designed to enhance oral English communication competence among engineering students. Grounded in communicative, task-based, and content-integrated teaching principles, the model demonstrates practical applicability in technical education settings. The results provide compelling evidence that embedding professionally authentic oral activities into the engineering curriculum significantly improves learners' fluency, vocabulary precision, and communicative confidence. Specifically, this model facilitates the development of field-relevant speaking skills by leveraging role-plays, case discussions, project-based tasks, and reflective practices, all of which mirror real-world professional interactions.

Research Limitations

Despite promising results, several limitations must be acknowledged:

- The quasi-experimental design, while appropriate for educational interventions, lacks the full control of randomized experimental studies.
- Longitudinal outcomes, such as the long-term retention and transfer of communication skills to professional environments, were not assessed within the current research timeframe.

Policy Implications for Theory and Practice

The findings imply several directions for educational policy and curriculum development:

- Technical universities should reform ESP syllabi to prioritize oral communication and adopt context-rich, discipline-specific methodologies.
- National education bodies should promote teacher training programs that integrate CLT, TBLT, and CLIL approaches tailored for engineering education.
- Language competence assessment frameworks in technical institutions must evolve to include dynamic and performance-based speaking tasks reflecting real-world engineering scenarios.

References

1. AI Integration Into Andragogical Education // Pedagogy, Instruction, and Administration. – Hershey: IGI Global Scientific Publishing, 2025. – P. 181–208.
2. Carol A. Chapelle Chapelle C. A. Computer Applications in Second Language Acquisition: Foundations for Teaching, Testing and Research. – Cambridge: Cambridge University Press, 2001. – 226 p.
3. Dell Hymes Hymes D. On communicative competence // Sociolinguistics / Eds. J. B. Pride, J. Holmes. – Harmondsworth: Penguin, 1972. – P. 269–293.
4. Hooda M., et al. Artificial intelligence for assessment and feedback to enhance student success in higher education // Mathematical Problems in Engineering. – 2022. – Vol. 2022. – No. 1. – P. 52157.
5. Kakhkharova M., Tuychieva S. AI-enhanced pedagogy in higher education: redefining teaching-learning paradigms // 2024 International Conference on Knowledge Engineering and Communication Systems (ICKECS). – IEEE, 2024. – Vol. 1. – P. 1–6.
6. Sandra J. Savignon Savignon S. J. Interpreting Communicative Language Teaching: Contexts and Concerns in Teacher Education. – New Haven: Yale University Press, 2002.
7. Gallastegui L. M. G., Forradellas R. R. Optimization of the educational experience in higher education using predictive artificial intelligence models // Revista de Gestão Social e Ambiental. – 2024. – Vol. 18. – No. 5. – P. e07111.
8. Henry G. Widdowson Widdowson H. G. Teaching Language as Communication. – Oxford: Oxford University Press, 1978.
9. Rao G. T., Suhasini N. Integrating artificial intelligence in higher education to enhance teaching and learning // Computer Applications in Engineering Education. – 2025. – Vol. 33. – No. 6. – P. e70085.

10. Gallastegui L. M. G., Forradellas R. R. Optimization of the educational experience in higher education using predictive artificial intelligence models // Revista de Gestão Social e Ambiental. – 2024. – Vol. 18. – No. 5. – P. e07111.
11. Michael Long Long M. H. Second Language Acquisition and Task-Based Language Teaching. – Malden, MA: Wiley-Blackwell, 2015. – 404 p.
12. Rod Ellis Ellis R. Task-Based Language Teaching and Learning. – Oxford: Oxford University Press, 2003. – 387 p.
13. David Nunan Nunan D. Task-Based Language Teaching. – Cambridge: Cambridge University Press, 2004. – 222 p.
14. Michael McCarthy McCarthy M., O'Keeffe A. Research in the teaching of speaking // Annual Review of Applied Linguistics. – 2004. – Vol. 24. – P. 26–43.
15. Wayne Holmes Holmes W., Bialik M., Fadel C. Artificial Intelligence in Education: Promises and Implications for Teaching and Learning. – Boston: Center for Curriculum Redesign, 2019. – 240 p.
16. Rose Luckin Luckin R., Holmes W., Griffiths M., Forcier L. B. Intelligence Unleashed: An Argument for AI in Education. – London: Pearson Education, 2016. – 48 p.
17. Yusupalieva S. Developing students' speaking competence using authentic materials with information technologies // International Journal of Industrial Engineering, Technology & Operations. – 2024.
18. Yusupalieva S. Using media to improve students' communicative competence in higher educational institutions // Media Communication: Politics of Language and Culture. – 2024. – Vol. 980. – P. 857.