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Evaluating the effectiveness of digital scenario-based English teaching at the university level using the artificial intelligence generated content

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This study evaluates the effectiveness of digital scenario-based English conversation teaching at the university level using Artificial Intelligence Generated Content (AIGC). This study aims to design a digital-scenario-based AIGC teaching model, to evaluate its effectiveness on the learning experience and communication skills of the students, and to identify the pedagogical and technical challenges related to it. Through the mixed-method approach that involves 130 first-year English majors at the Punjab University of Pakistan, the research applied a comparative experiment of 18 weeks (experimental group: AIGC Framework; Control Group: Traditional Methods). The results demonstrated that the AIGC model dynamically generated the pronunciation, language accuracy, and communication flow compared to the scenario-generated, interactive functions, and the personal response in real-time. Additionally, the model increased learning interest, work adaptability, and teacher-student interactions. However, challenges included the quality of incompatible material, limited emotional depth in AI interaction, technical adaptability barriers for less efficient students and risks of more dependence on technology. The study concludes that while AIGC provides transformational ability to learn individual, immersive language, its successful integration requires advanced teacher training, strong material review mechanisms, and analogous support for diverse learners. The recommendations highlight refining cultural relevance, ensuring moral deployment, and discovering multimodal AI integration for future educational innovation.

KEYWORDS

artificial intelligence generated content (AIGC), digital scenario-based learning, English language teaching, communication skills development, higher education innovation

1 Introduction

1.1 Background of study and research significance

The integration of AI-generated content has been used as a transformative method in language education for university-level students. In this digital era, there is a significant increase in the requirement for skilled and innovative teaching techniques to fulfill the diverse needs of learning. AIGC-based content represents a promising solution that can provide the personal, interactive, and adaptable learning experiences to the learners. The

primary purpose of this research is to find out the effectiveness of this AIGC in increasing language skills, enhancing the engagement of students, and improving the efficiency of teaching methods at the university level (Wang, 2025; Younas et al., 2025b). Different tools based on AIGC effectively increase the different aspects of language learning that include advanced writing, reading, grammar, and spelling, run by Advanced AI technology (Alshammari, 2024; Bashir et al., 2025). By simulating the conversational scenarios of real life, these tools can offer excellent opportunities to the students for good practice of language skills, dialogues and in obtaining the real time feedback. For example, the model based on AI has shown its remarkable ability to improve the student speaking, listening, reading, and writing proficiency, and also supports their effectiveness in higher educational contexts with various studies (Abimanto and Mahendro, 2023; Imran et al., 2024). One of the significant benefits of this AIGC is its ability to offer a personal and adaptable learning environment. The model based on AIGC can automatically adjust the speed and content of different instructions according to the individual requirements of the student. Also promoting excellent and effective learning outcomes (Yang et al., 2023; Jabeen, 2023). Intelligent teaching systems and AI-based Chatbots can allow learners to have one-to-one interactions, provide real-time feedback and guidance that is usually difficult in traditional teaching methods. These personal and individual methods can promote self-guided and autonomous learning, which is very crucial for proper engagement of students (Loor et al., 2024). Additionally, the usage of AIGC at the university level tutoring is linked with a great improvement in making the teaching effective. Recent studies show that AI-based teaching methodologies can improve teaching efficiency by 96%, enabling an effective the educational process and reducing the hectic workload on teachers (Tang and Zhang, 2023). Moreover, the addition of advanced technologies like virtual reality (VR) and augmented reality (AR), can further improve the engagement of students by developing an interactive and dynamic learning environment (Phuong, 2024). With a great number of benefits, the use of AIGC in English conversational teaching also have various challenges Like, over-dependency on the AI and inaccurate AI developed material can raise concerns about the moral allegations and the limitation of AI in education. These challenges show the importance of continuous development and research to refine and ensure the accuracy of AI models and address their arrangement (Hidayatullah, 2024; Sarnovska et al., 2024). The importance of research about the effectiveness of digital scenario-based English conversational teaching at the university level using AIGC lies in its ability to improve personalized learning, student engagement, and make a revolution in language education by promoting innovative teaching methods. AIGC tools like ChatGPT can improve the efficiency of teachers, self-directed education, and student language skills, i.e., writing, reading, and grammar (Wu, 2021). Although this method provides an interactive and dynamic learning environment, it increases the challenges of overdependence on technology and raises questions about the integrity of educational systems. To improve the impact of AIGC on language education, it is important to create a balance between the risks and benefits, ensure that it will improve the teaching method and student learning outcomes in higher education (Mohammed and Khalid, 2025). Thus, the objective of this study is to evaluate the effectiveness of AIGC in digital scenario-based English conversational teaching at the university

level, in which the skill growth, efficiency of teachers, personal learning, and engagement of students are the main focuses.

1.2 Research gap

Besides many promising outcomes of AIGC in language education, there is a limited research on its specific utilization in digital scenario-based English conversational teaching at the university level. The key gaps are the unexplored technical hurdles and challenges, like compatibility of platform and pedagogical problems, like expertise of teachers, and adaptability of students. Moreover, while the AIGC technology can improve student engagement, it still raises concerns about the over-dependency on the technology and its inability to replicate emotional depths in the teaching method. This study addresses all of these gaps by evaluating the effectiveness of AIGC for improving learning experiences and communication skills.

1.3 Research objectives

The aim of this study is to investigate the usage of teaching methods based on AIGC-powered digital scenarios at university-level English conversational classes. The main objectives of this study are listed below.

- 1 To design and develop a digital scenario-based teaching framework, based on AIGC technologies.
- 2 To assess the impact of using teaching methods based on AIGC-powered digital scenarios in the improvement of the students' communication skills (Interaction proficiency, speaking ability) and overall learning experiences, such as engagement and motivation.
- 3 To explore the potential technical challenges (platform compatibility and content quality) and pedagogical problems (teacher expertise, student adaptability) that occur during the application of this teaching model.

1.4 Research questions

- 1 How can an AIGC-based digital scenario teaching framework be effectively designed and implemented?
- 2 What effects does this teaching model have on students' communication skills and learning experience?
- 3 What technical and pedagogical challenges arise when implementing this teaching model?

1.5 Research innovations and contributions

1.5.1 Theoretical innovation

This research presents an innovative approach, integrating the content generated by Artificial Intelligence (AIGC) in the field of teaching based on digital scenarios. It is a pioneer in creating a new instructional structure that combines the dynamic resources of AIGC generation with immersive and experimental scenario-based teaching aspects. In doing so, the study increases the limits of traditional digital

education theories and provides a new theoretical perspective on how advanced technologies, such as AIGC, can enrich English language instruction at the university level. The theoretical ideas generated by this research will help reformulate academic discourse around education, offering robust support to future research on the use of AIGC in educational contexts.

1.5.2 Practical innovation

At a practical level, this study designs and applies a broad AIGC-based teaching solution to university level English conversation courses. It examines the entire process involved in creating this model, from the design of realistic and attractive teaching scenarios to the generation of relevant functions as well as integration of real time feedback mechanisms. This framework is practical and can provide the implicative insights for the instructors who aim to adopt or try this AIGC method in their lectures. This case study highlights the important challenges and stages in the teaching model. It also provides valuable instructions for the instructors who wish to try to use a new technological teaching method. Particularly, this is very crucial for the frontline teachers who are navigating the complexities of using AI-based teaching content in their lectures.

1.5.3 Empirical contribution

This study presents the evaluation of the effectiveness of the digital scenarios teaching model based on AIGC. It evaluates how this teaching model influences the different aspects of learning, such as communicational improvement (oral expression, interacting skills), improvement in learning experiences (student engagement and motivation). Additionally, the study also checks the contribution of this new model to the overall efficiency of instructors, which highlights how AI technologies can improve the teaching process and develop more responsible and adaptive learning experiences. Besides many benefits, it also examines the technical and educational hurdles that occur during the implementation of this study like content quality, compatibility of platform, and the technical skills required for both teachers and students. The empirical findings provide significant insights into the practical feasibility of this new integration and important recommendations to adopt the AIGC technologies widely in future educational and research practices. This study not only deals with the theoretical knowledge but also provides solid solutions based on evidence for instructors and educational institutions seeking to use AI in the improvement of language education. This contributes to the ability of AIGC and increases the understanding of the educational hurdles, while keeping it as an essential tool for future education and learning.

2 Literature review

2.1 Theories and practices of digital scenario-based teaching

The digital scenario-based teaching model is a method that uses information technology to develop a virtual or improved environment for teaching to enhance the acquisition of knowledge and development of skills (Ahmad, 2019; da Silva Tiago and Mitchell, 2024). As per the theories of constructive learning, this method mainly focuses on encouraging students to develop a knowledge by fake or actual

scenarios and by hands-on experiences (Zenios, 2020). In the language learning, a teaching method based on digital scenarios usually involves multimodal resources like audio, video, virtual reality and interactive tasks, which engage the students and improve their language skills (MacLeod et al., 2022; Younas and Dong, 2024).

Teaching based on digital scenarios can provide significant advantages to language students by providing active connectivity and encouraging the reality-based applications of language skills (Kim and Namkung, 2024). By using the virtual environment, this approach allows the learners to hear, speak, write, and read in real contexts, which is usually difficult in traditional language classes. The implementation of technologies like virtual reality and augmented reality can improve this experience further by developing a highly interactive and stimulating environment that directly improves the cognitive and linguistic abilities of students (Xuan, 2025; Younas et al., 2024). This approach allows teachers to adapt to learning based on the needs of each student, adjusting speed and difficulty according to their progress and challenges (Procel et al., 2024). As a result, digital landscape-based teaching helps students learn in principle how they use language in real situations, and prepares them for effective communication in the real world.

Despite the promising benefits, many challenges hinder the full use of digital scenario-based teaching ability. One of the main obstacles is to ensure the quality and interaction of the scenario (Perez and Poole, 2019). If not carefully designed, there may be a lack of depth and connectivity required to motivate students in the digital environment, making it difficult for them to develop meaningful communication skills (Tiu et al., 2023). In addition, the effectiveness of these devices depends on educational goals and their alignment with the learning process. Teachers should balance technical aspects with a sound understanding of language acquisition principles to create scenarios that are not only engaging, but also increase the development of the language (Kong and Yang, 2024). Research in adaptation of scenario design continues to detect ways to enable these environments to be able to simplify individual and complex, real-world interactions that provide valuable learning opportunities for students.

In recent years, the use of digital scenario-based teaching in university level English courses has gained momentum. Research suggests that this approach helps students to practice language production and interaction within realistic, simulated references, which improves their oral communication and overall language capacity. However, current instructional design faces challenges such as dynamics and the lack of interaction in the scenarios, which fail to provide students with a completely authentic communication environment. Consequently, the optimization of the design of these scenarios has become a major field of focus in research running on digital scenario-based teaching to make them more generous and interactive (Bai et al., 2024). Digital scenario-based teaching combines the theoretical foundation with innovative technology to create attractive and immersive learning experiences. By integrating constructive principles with equipment such as VR, AR, and multimedia resources, this approach not only enhances language skills but also provides personal and adaptive learning avenues (Hidayatullah, 2024; Tang and Zhang, 2023). As it continues to develop, digital scenario-based language teaching promises to reopen education and provide students with a real-world, interactive experience that promotes deep understanding and skill mastery.

2.2 Current status and challenges in university-level English conversation instruction

University level English conversation instructions face significant challenges that hinder students' practical communication skills, which are essential in terms of the global professional environment. These challenges mainly include linguistic difficulties, psychological obstacles, and environmental factors, which disrupt students' progress in achieving functional language proficiency (Phuong, 2024). The need for effective educational strategies to solve these challenges has become more pronounced, as traditional methods have proved inadequate in fully equipping students with the skills required for real-world communication. The main goal of university-level English conversation instructions is to develop students' communication ability, which responds to the increasing demand for skilled English speakers in a global world (Zhai and Wibowo, 2023; Rafique et al., 2018). Traditional methods often rely on textbook-based dialogues, where teachers lead classes while students participate in brief group discussions or role-drama. However, these approaches often fail to effectively improve students' practical communication skills (Xuan, 2025).

A major challenge is the limited classroom time and resources, which restrict students' opportunities and restrain opportunities to obstruct the rapid growth of their oral communication abilities (Musabal and AbdAlgane, 2023). Additionally, textbook materials often lack real-world relevance, distinguishing students from real communication contexts, which limits their ability to apply language skills in everyday conditions (Ottu et al., 2024). The high student-to-teacher ratio and lack of individual learning resources further reduced the effectiveness of the instructions (Funda and Mbangeleli, 2024).

Another issue in the English conversation instructions faces students of linguistic obstacles, especially in the context of limited vocabulary, poor sentence structure, and frequent grammatical impurities. These difficulties make students unable to express themselves clearly and effectively (Qayyum et al., 2024). Non-native speakers, in particular, often struggle with confusion and selection of appropriate vocabulary in stressful situations, which disrupts their ability to participate confidently in further interactions (Anggrisia and Robah, 2023). These challenges are complicated by the lack of an immersive and relevant learning environment, where students can practice these language skills in realistic settings, which can help them improve their authentic communication functions.

The fear of ridicule or being judged by peers often increases these psychological challenges, preventing students from taking risks and practicing language in a low environment (Funda and Mbangeleli, 2024). As a result, many students avoid opportunities to speak, limiting their language development. This hesitation can create a vicious cycle, where the lack of practice hinders progress in the building flow (Younas, et al., 2025a).

Environmental factors also contribute to the challenges faced by university level English conversation instructions. Limited opportunities for practice outside the classroom, in association with an insufficient supporting learning environment, hinder students from developing their speaking skills (Kim and Namkung, 2024). In real-life contexts, without frequent contact with English, students find it challenging to bridge the difference between theoretical knowledge and practical language use (Blanco, 2024). Traditional classroom

settings, with a large student-to-teacher ratio, often lack individual students' needs, which limits the ability to practice meaningful language. In addition, students cannot be encouraged to participate actively, especially when the learning environment does not promote cooperation or interaction (Lao et al., 1996). Despite these challenges, there is evidence that some students are capable of using effective strategies to improve their conversational skills [37]. Techniques such as code-switching, where students have been identified as a valuable tool in controlling linguistic and psychological obstacles, and collaborative teaching, which encourages alternative and collaborative teaching between languages to facilitate understanding (Adeoye et al., 2024).

By promoting a more interactive and supportive class environment, these strategies help to create opportunities for students to practice speaking without fear, eventually improve their flow and confidence. Encouraging group discussion, role-drama, and work-based activities further enhances this approach by allowing students to engage in the use of realistic, relevant language (Younas et al., 2024). To address these issues, there is a clear requirement for technology to provide teachers with new teaching methods and students with authentic and diverse language practice opportunities. All of these improvements can overcome the limits of traditional methods, which can further improve the rich and practical experience of learning (Marcjanik, 2023).

2.3 Applications of artificial intelligence generated content (AIGC) in education

AIGC has increasingly gained attention in educational research because of its ability to improve teaching and learning methods (Dai et al., 2023). By using the advanced language models like ChatGPT, AIGC can produce a wide range of high-quality content, such as writing examples, conversational simulations, and scenario-based exercises (Afzaal et al., 2024). The main advantage lies in its power to personalize and automate the content, which offers a great learning experience for the instructor (Kim and Namkung, 2024; Imran et al., 2025). AI-based scenarios allow the learners to participate in real-life language exchanges, aiding them in developing their skills in practical language. Additionally, the AIGC provides real-time feedback that includes guidance and improvements in vocabulary and grammar. This allows the students to make real-time adjustments and self-instructed learning development (Dai et al., 2023; Li et al., 2024). The integration of this method in education brings a revolution in both learning and teaching methods by providing personalized experiences and changing the evaluation criteria (Nah et al., 2023). The ability of AIGC to develop customized educational content has been widely recognized for its role in improving student engagement and understanding (Liu, 2024; Imran and Almusharraf, 2023a). This enables the creation of learning content that properly suits the personal requirements of the students, which aid them to improve their understanding of concepts. In professional English teaching, the AIGC also improved the evaluation process and offers more targeted methods for students (Hu, 2024).

In terms of evaluation, AIGC facilitates the use of new strategies that allow for real-time response and adaptive teaching track, which leads to better student performance (Li J. et al., 2024; Imran and Almusharraf, 2023b). For example, in accounting education, AIGC enhances interaction and practical application, enabling students to better understand and

implement theoretical knowledge in real-world scenarios, promoting learning efficiency (Lu et al., 2024). In addition, AIGC provides valuable assistance to teachers by automating regular administrative tasks, giving them create a collaborative learning environment (Wei and Qi, 2024). While AIGC makes great promises in education, many challenges remain. These include the accuracy and relevance of the material generated, as well as the need for cultural sensitivity and data privacy issues (Li L. et al., 2024). Ensuring that the AIGC aligns with educational goals and educational standards, while its potential benefits are maximized, would be an important field for future research and development (Nah et al., 2023; Imran and Almusharraf, 2024; Shaber et al., 2025). However, effective integration of AIGC in education also requires resolving several challenges. Teachers require appropriate training and resource allocation to fully exploit the capacity of these AI devices. Additionally, concerns about educational integrity and moral implications of AIGC use must be managed to carefully ensure the application responsible in educational settings. Despite these challenges, AIGC makes much promise to improve educational practices, increase student learning experiences and promote innovation in teaching and evaluation (Wei and Qi, 2024; Wang et al., 2025).

3 Research design and methodology

3.1 Study locale and population

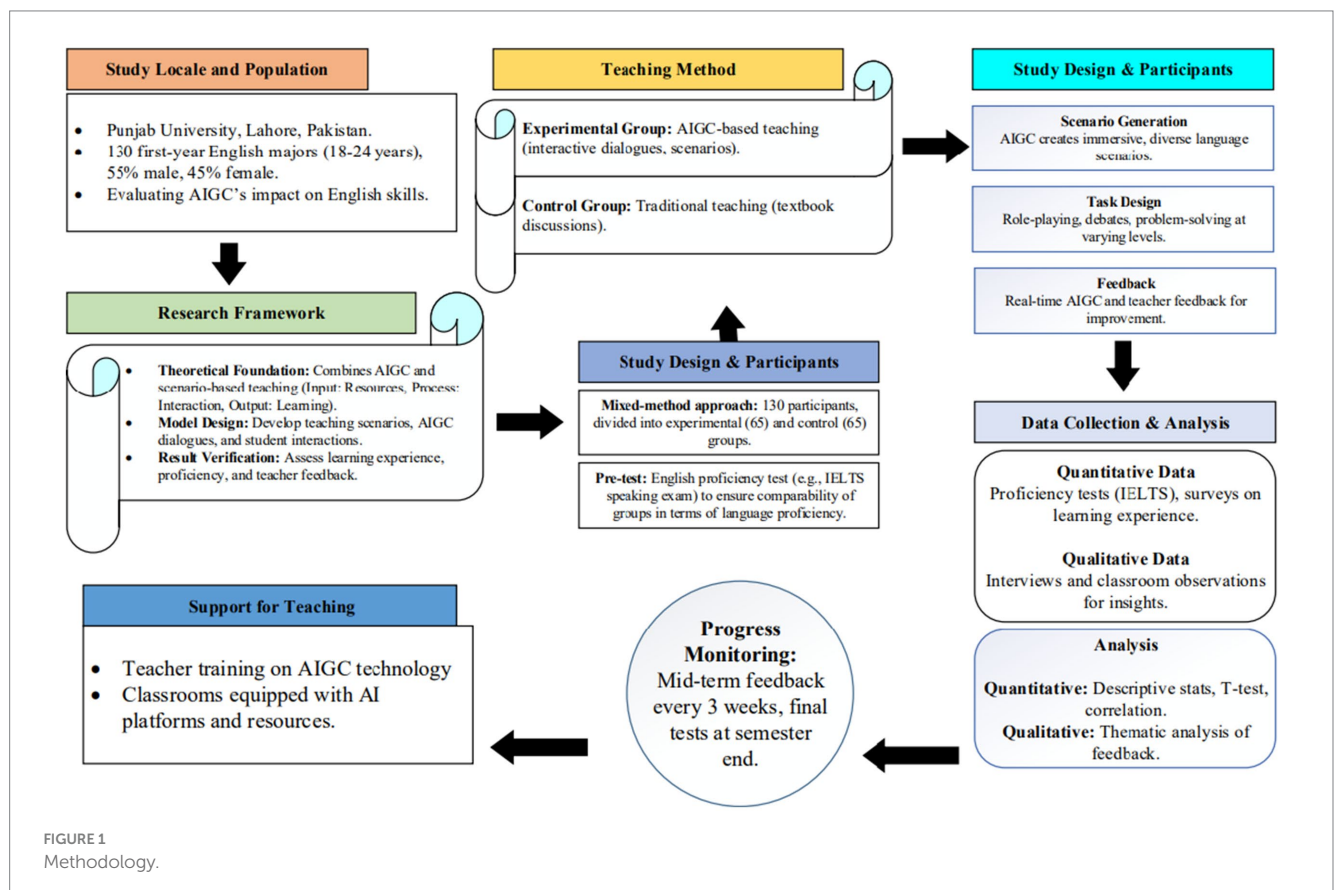
This study was conducted at the University of Punjab, located in Lahore, Pakistan. The participants of the study were 130 first year

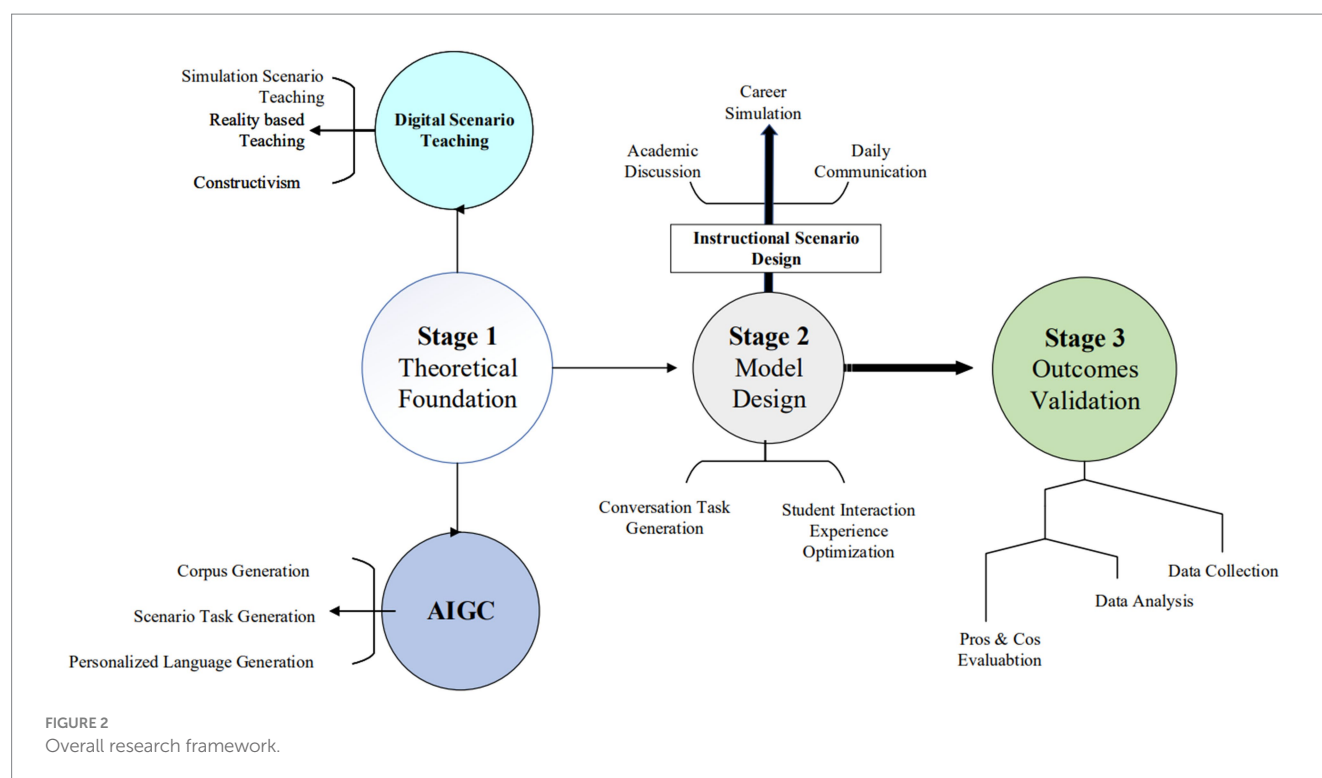
students with English language as their major. Their age ranged between 18 and 24 years and are assessed as having an intermediate level of English proficiency. The population consisted of the 55% Male and 45% Female students, representing the typical demographics of first year English Majors. All the selected participants were enrolled in an English conversational course to evaluate the effectiveness of AIGC technology in the improvement of the language skills at the university level. The overall methodology of this study is shown in Figure 1.

Figure 2 outlines a three-stage process for developing and validating a digital scenario teaching model with the help of Artificial Intelligence Generated Content (AIGC). Stage 1 (Theoretical Foundation) integrates digital scenario teaching principles, such as constructivism, simulation, and reality-based teaching, while leveraging AIGC for generating personalized language tasks and scenarios. In Stage 2 (Model Design), the instructional scenario is designed for various contexts (career simulation, academic discussion, daily communication), focusing on generating conversation tasks and optimizing student interaction. Stage 3 (Outcomes Validation) involves evaluating the designed model through data collection, analysis, and assessing its pros and cons. The flow shows how theoretical concepts and AI capabilities combine to create and validate effective digital teaching scenarios.

3.2 Research framework and model

The study is structured around a three-phase structure: the theoretical foundation, model design, and result verification (as





shown in Figure 2). And adapts a mixed method approach to investigate the impact of teaching methods based on AIGC-powered scenario at university level English conversation instructions.

- *Theoretical foundation:*

In this initial stage, the study integrates the principles of digital scenario-based teaching with the unique capabilities of AIGC for the creation of a theoretical model. The model is composed of three main components: input (teaching resources and AIGC-reacted tasks), process (work interaction and reaction system), and output (learning results). The foundation establishes a structure that combines both traditional education principles and new possibilities provided by AIGC.

- *Model Design*

The second phase focuses on the identification and development of key components and processes to implement the teaching model. This includes the creation of teaching scenarios, generations of dialogue work through AIGC, and designing student interaction experiences. The model design ensures a consistent and effective structure for teaching activities, leading to a spontaneous integration between technology and education.

Figure 3 illustrates the process of language learning with multimodal assistive tools: beginning with input setup (teaching objectives, dialogue tasks), progressing through dynamic student interaction and system feedback, and resulting in improved technical and language abilities and increased learner interest.

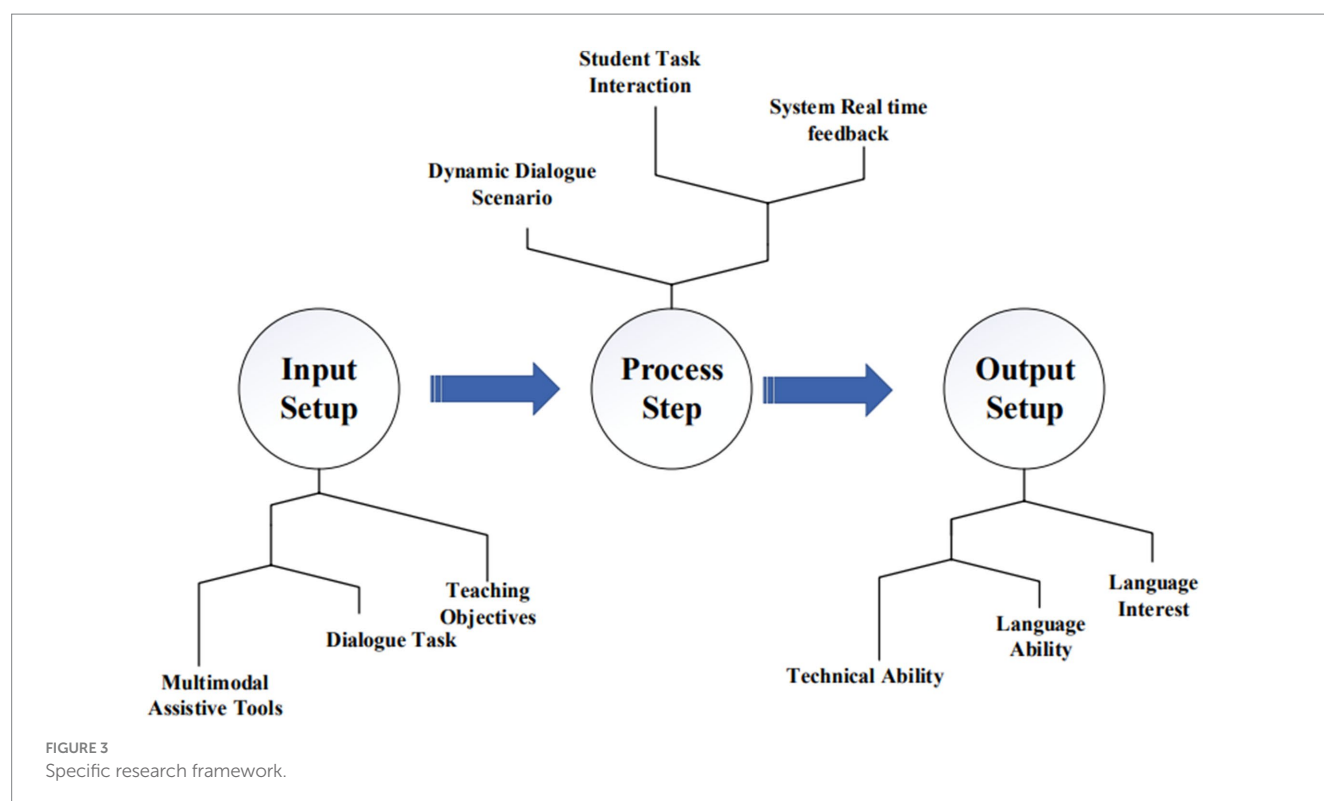
- *Result verification*

In this stage, empirical research is done to assess the effectiveness of the model. The assessment mainly focuses on students' learning experience, language proficiency, and their teacher's response. The study also analyzes both the advantages and boundaries of the model, which provides a comprehensive evaluation of its practical and theoretical implications. The specific research framework is shown in Figure 3.

- 1 Input step: This phase focuses on collecting various teaching resources and designing tasks, including AIGC-borne communication work and multimodal tools (Speech recognition and real-time translation). It also ensures alignment with defined learning purposes.
- 2 Process phase: This step emphasizes functioning and scenario-based teaching. AIGC dynamically creates dialogue scenarios, allowing students to engage in interactive functions. Real-time response is provided to give personal suggestions for improvement, to increase learning experience.
- 3 Output Step: In the final stages, the study evaluates the results of learning, including language proficiency (intonation, accuracy, and flow), learning interest, and students' adaptability for the technology used in the orbit.

3.3 Study design and participants

The study used a mixed-method approach to assess the effectiveness of AIGC-based digital scenario teaching. The total 130 participants were randomly divided into two groups, namely, experimental group and control group. Both groups were assigned 65 participants.



- Group Allocation and Baseline Assessment

The language of the students is a pre-test to measure and ensure that both groups are comparable. Additionally, background information, such as pre-English performance and their ability to adapt to digital learning equipment, is collected.

- Instructional Implementation

- 1 Experimental Group: This group participates in AIGC-based digital scenario teaching sessions twice a week, including fake dialogue and interactive scenarios to promote active language use.
- 2 Control Group: Students of this group follow traditional teacher-led instructions, including group discussions based on textbook dialogue and traditional teaching methods.

3.4 Teaching model design

There are three main components of the teaching method based on the AIGC-driven digital scenario, as shown in Figure 4.

- Scenario Generation:

The AIGC technology plays an important role in creating a wide range of language scenarios corresponding to both the direct goals and the proficiency levels of the students. These scenarios include a variety of references, including everyday interactions, professional dialogues, and cultural themes, which are presented

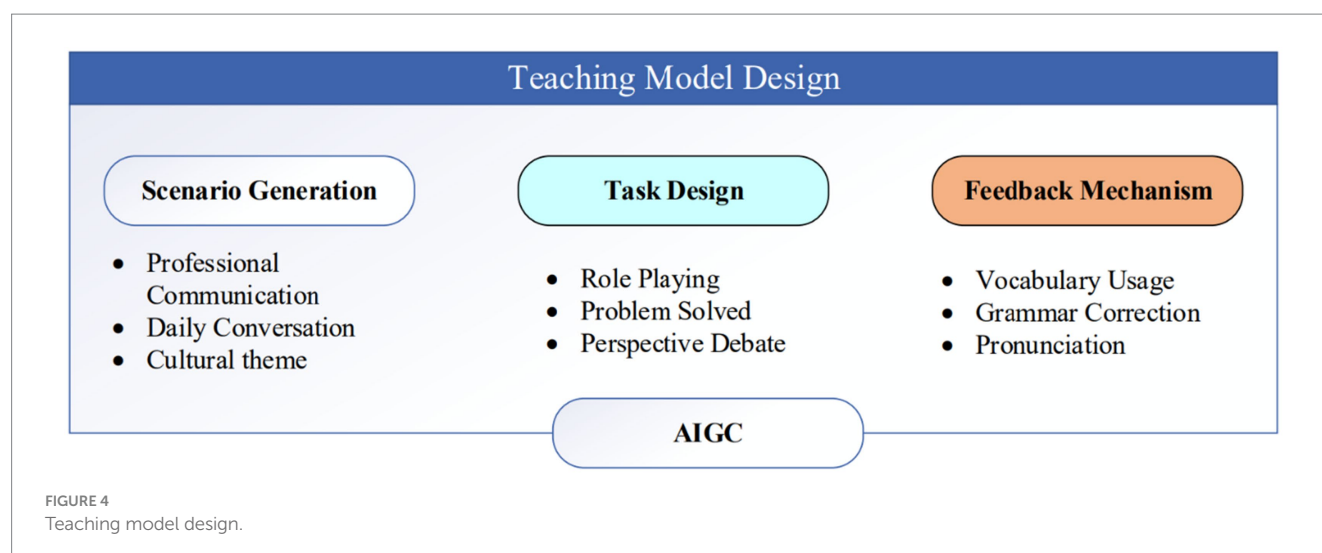
in attractive and dynamic formats such as lessons, audio, and videos. By offering a rich, immersive experience, scenarios help students interact with language in more authentic and diverse settings.

- Task Design:

After the creation of scenario, many interactive tasks like role-playing, debates and problem-solving exercises. These activities encourage the students to use the language in real situations that promote student engagement. The difficulty level for these tasks is carefully calibrated to increase to help the students improve their language and thinking skills as they advance through the learning process. This method guarantees that the work remains stimulating and beneficial for the students at different proficiency levels.

- Feedback Mechanism:

AIGC provides real -time response, analyzes the language production of students, and gives personal suggestions to improve various aspects such as vocabulary usage, grammar, and pronunciation. In addition to automated responses, teachers' and students' interactions and colleagues contribute to further strengthening the learning process, promoting a collaborative and supportive environment for improvement. This teaching model prioritizes student-centric learning by encouraging active participation through dynamic scenarios and functioning activities. The ultimate goal is to enhance the communication capacity of students, enriching their overall learning experience, ensuring that both language skills and engagement are maximized.



3.5 Data collection and analysis methods

To assess the effectiveness of the AIGC-based teaching model, a mixed methods approach is utilized for data collection and analysis, incorporating both qualitative and quantitative methods.

3.5.1 Quantitative data collection

- **Language Proficiency Assessments:** Standardized tests, such as IELTS speaking exams, are conducted before and after the intervention to evaluate improvements in students' oral and communicative abilities.
- **Learning Experience Surveys:** Surveys are distributed to collect students' feedback on their satisfaction and interaction with the course. These surveys assess various factors, including an increase in growth, adaptability for relevant changes, and perceived difficulty of functions.

3.5.2 Qualitative data collection

- **Interviews:** Provide an insight rich in their personal experiences, challenges, and suggestions to refine the intensive interview model with both teachers and students.
- **Classroom Observations:** Detailed observations are noted during teaching sessions, capturing the performance of students' behavior, participation levels, and functions.

3.6 Data analysis

- 1 **Quantitative Analysis:** Descriptive statistics, T-test, and correlation analysis are used to determine the impact of AIGC-based teaching models on the language proficiency and overall learning experiences.
- 2 **Qualitative Analysis:** Thematic analysis is applied to qualitative data to identify recurring subjects and remove major perceptions and responses from both students and teachers. This mixed approach allows for a well-rounded evaluation of

the effectiveness of the model, combining numeric data with rich, relevant insights.

3.6.1 Data collection and progress monitoring

Mid-term response is collected every 3 weeks to assess students' progress and experiences. At the end of the semester, final tests and satisfaction surveys are administered to measure the overall effectiveness of the teaching model.

3.6.2 Support for teaching

Experimental group teachers receive special training in AIGC technologies to ensure that they can effectively apply new teaching models. The experimental setup is equipped with essential equipment such as an AI platform and interactive resources to facilitate the use of AIGC. The external variables that can affect the results are carefully controlled to maintain the scientific hardness of the study and to ensure the reliability of the conclusions.

This experimental design ensures a complete comparison between the AIGC-powered models and traditional learning methods, providing insight into the impact of the AI-enhanced instructions on the students' performance.

4 Empirical research and results analysis

4.1 Evaluation metrics for teaching effectiveness

To strictly evaluate the success of the AIGC-based digital scenario teaching model, a comprehensive assessment structure was designed, which included three major dimensions: language proficiency, learning experience, and technical adaptability. Each dimension is evaluated through specific indicators, as mentioned in Table 1. Each dimension is designed to assess a separate aspect of the teaching process, which ensures students' language skills, engagement, and a well-round evaluation of the effectiveness of the AIGC-based model in increasing the ability to adapt to technological innovation.

TABLE 1 Evaluation metrics for teaching effectiveness.

Dimension	Indicator	Specific content	Max score
Language proficiency	Pronunciation and intonation	Clarity and smoothness of speech delivery	10
	Communicative fluency	Natural flow and logical coherence in communication	10
	Language accuracy	Correctness in grammar and vocabulary usage	10
Learning experience	Interaction quality	Frequency and effectiveness of teacher-student and peer interactions	10
	Learning interest	Level of engagement and active participation in tasks	10
Technology adaptability	Task acceptance	Comfort and adaptability to AIGC-generated content	10
	Technology satisfaction	Overall satisfaction with AIGC tools and applications	10

4.2 Analysis of students' language proficiency improvement

Comparison between pre-testing and subsequent results of testing reflects adequate progress in the language proficiency of the experimental group in all assessed areas (Figure 5).

The results indicate significant improvements in the language proficiency of the experimental group. The experimental group demonstrated an adequate advantage in speech clarity, grammar accuracy, and logical flow of communication, with subsequent scores after the test reflecting a notable increase in all dimensions. This improvement highlights the effectiveness of AIGC-based dynamic scenarios and personal reactions in enhancing students' practical language skills through the real world and interactive learning experiences.

On the other hand, the control group only showed slight improvement, which shows a more limited impact of traditional learning methods. These findings suggest that traditional approaches provide some progress, AIGC-Interested Teaching Model provides more adequate benefits in language proficiency.

4.3 Analysis of student satisfaction and interaction experience

According to the satisfaction survey and class observation (Figure 6), the experimental group showed particularly high satisfaction, especially about work partnership and interaction experiences.

Students of the experimental group appreciated the innovation and relevance of AIGC-related tasks, which significantly increased

their interest in learning. In addition, interactive components of tasks increased the student engagement and encouraged more feelings of cooperation. On the other hand, the control group reported a sense of monotony with traditional methods, where limited conversations in the classroom negatively affected their inspiration and overall learning experience.

4.4 Adaptability of different student groups to the teaching model

The study investigated how various student groups adapted to AIGC teaching models, considering factors such as gender, language proficiency, and technical familiarity (Figure 7).

The experimental group preferred new and relevant AIGC-related tasks, which they were more interested in learning. The interactive nature of these tasks helped the students to attach more and feel more associated with their peers in the classroom. On the other hand, the control group found traditional teaching methods boring, with low classroom conversation, which led to a lack of inspiration and enthusiasm to learn.

5 Discussion

The findings of this study highlight the transformative potential of a teaching model based on AIGC in enhancing the proficiency of language, engagement of students, and overall learning experience in English conversational classes at the university level. The experimental group, which was tested on AIGC-powered digital scenario-based instructions, shows a significant gain in language proficiency in different domains like intonation, grammar accuracy, pronunciation, and fluency in communication. These improvements are mainly the outcomes of the dynamic and immersive nature of AIGC, which develops an interactive and reality-based learning environment. Unlike the old traditional teaching techniques, in which the delivery of content is usually unidirectional and static, the AIGC models can allow the learners to have good engagement in personalized learning, where they can practice their listening and speaking in reality-based digital contexts. The extraordinary ability of AIGC to provide students with real-time and personalized feedback on their written and spoken language is very important for improving their communication abilities. The feedback is a dynamic loop, which is the main strength of AIGC, it allows student to find and focus on their mistakes in real-time, which directly improves their language skills.

In comparison, the control group participants, who only followed the traditional teaching practices, showed slight improvement in their language proficiency. Although the control group has benefited from the instructions of structured classroom and peer interactions, the gains are less significant than those of the experimental group. This shows the limitations of the old traditional methods, which, despite their strengths in the promotion of basic skills acquisition, usually lack the adaptive and interactive elements that the AIGC-based model can easily provide. The comparatively less improvement in the control group suggests that these static and teacher-guided methods may struggle to maintain the engagement of students over time, especially for language learning, in which reality-based interaction and active

Language Proficiency Test Result

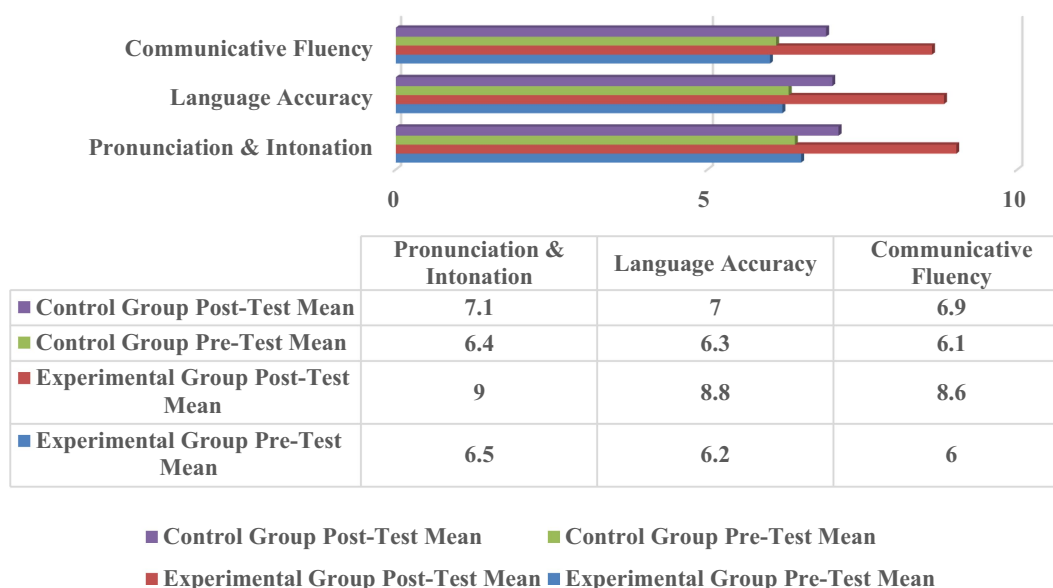


FIGURE 5
Language proficiency test result.

Student Satisfaction Survey Result

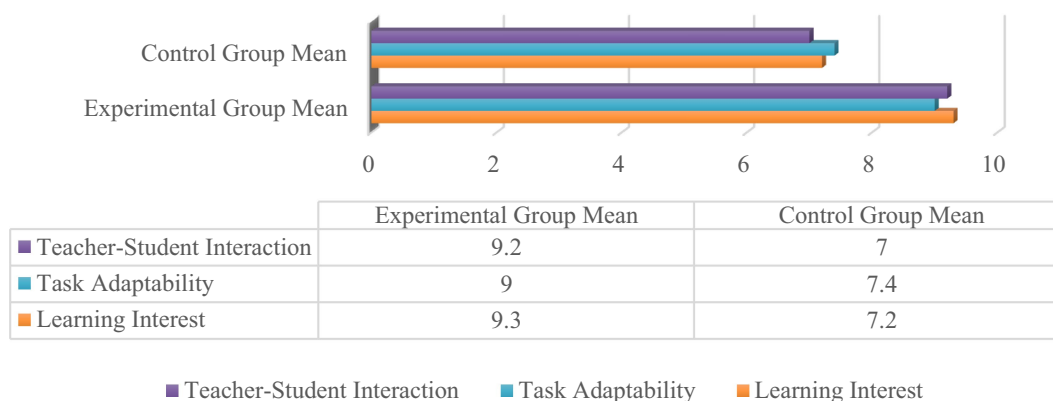
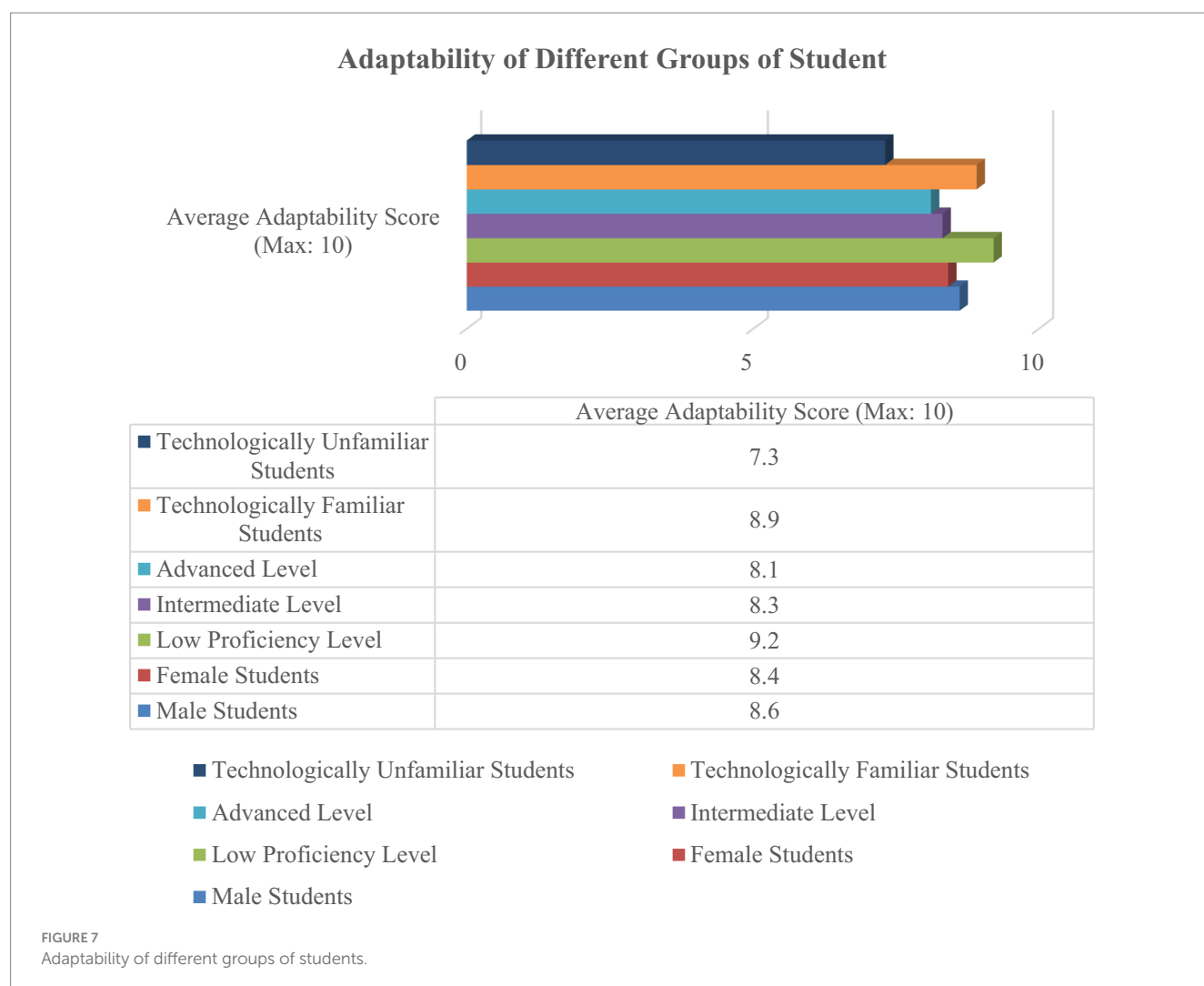


FIGURE 6
Student satisfaction survey result.

participation of learners are very important for the proper development of skills.

While discussing the satisfaction of students and their learning experience, the experimental group shows a high level of satisfaction as compared to the control group. Students in the experimental group acknowledged the relevance and variety of AIGC, which were perfectly aligned with the real use of language. Moreover, the Model based on AIGC has the ability to offer personalized feedback for students that helps them to maintain motivation and develop a sense of accomplishment. Students feel

more involved in the learning as they are not only the passive recipients of content, but they are also the active participants in their education journey. This active participation, when coupled with the dynamic nature of the content, mainly contributes to improving the students' learning interest and their motivation. All of these make the learning more rewarding and enjoyable. While on the other side, the students in the control group show dissatisfaction with the old traditional method of teaching. Many students complained about the disengagement and boredom, because of the limited variety in the teaching content and less



interaction. The setting of traditional classrooms usually depends on the textbook contents and group discussion, and cannot provide the same engagement level as AIGC-based models do. The static nature of these traditional content methods can decrease the enthusiasm in the students, mainly for those who wish for dynamic and technologically improved environments. This disagreement with other limitations of traditional methods lowers the learner's satisfaction in the control group.

Additionally, this study also examined the adaptiveness of the students to the new AIGC-based tutoring model. The results show that the experimental group shows higher adaptability with the modern AIGC tools, mainly those students who already knew about these technologies and digital learning platforms. These students like to accept the interactive and engaging nature of tasks and learn deeply from the content. However, the students with lower technical skills or those who are less familiar with the digital tools often face some hurdles when they use the AIGC for the first time. These kinds of students need additional training and support to fully engage with the content. Besides all these problems, even less technically sound students show better improvement over the course. This highlights that the AIGC model can accommodate

learners with different technical skills with proper guidance and support.

The results also suggest that the success of AIGC-based teaching method depends not only on the technical skills of the student but also on their willingness to accept this new mode of teaching. Overall, the experimental group shows a positive attitude toward the AIGC model, and their willingness to use technology plays a crucial role in this success. Additionally, the mixed-method approach used in this study provides valuable insights into the experiences of the students and their perception of the AIGC teaching model. The combination of qualitative and quantitative data reveals a positive shift in the student attitude and perception of the new method.

Overall, the outcomes of this study show the significant potential of AIGC-based models to improve the proficiency of language, engagement of students, real-time feedback, and overall outcomes of results. The ability of AIGC to provide the learner with a personalized, real-time feedback and simulate real-world scenarios that develop an immersive experience of learning, which is effective and engaging. Moreover, the study also points out that there are too many challenges that must be considered during the proper implementation of the new model in education.

5.1 Advantages and limitation of using AIGC in English conversation instruction

This study examines both the significant advantages and limitations of incorporating AIGC technology in English conversation teaching at the higher education level.

5.1.1 Advantages

- **Real-Time Scenario Generation:** AIGC can create a wide range of on-demand scenarios corresponding to specific teaching objectives and students' individual needs. These scenarios cover diverse subjects and communication references, which provide students with immersive, real-world language practice.
- **Personalized feedback:** AIGC can give a target response immediately to grammar, vocabulary, and pronunciation by analyzing the language production of students. This helps students quickly identify areas where they need improvement and need to adjust their language use.
- **Efficient use of resources:** AIGC reduces the time that teachers automatically create a lesson by generating instructional materials. This allows students to engage more in self-guided learning, creating a more resource-skilled learning environment.

5.1.2 Limitations

- **Inconsistent Content Quality:** While AIGC can produce a variety of language materials, some of which may include errors in grammar or cultural accuracy, this requires teachers to manually intervene and correct these issues.
- **Limited emotional interactions:** Although AIGC can provide reactions and can produce tasks, it leads to the emotional depth and nuances of human interactions, which can affect students' emotional engagement and obstruct the development of authentic communication skills.

- **Technical challenges:** For both teachers and students with limited experience with new techniques, learning state may arise, especially during the early stages of implementation. This can cause obstacles in adopting and reducing the effectiveness of the AIGC model.

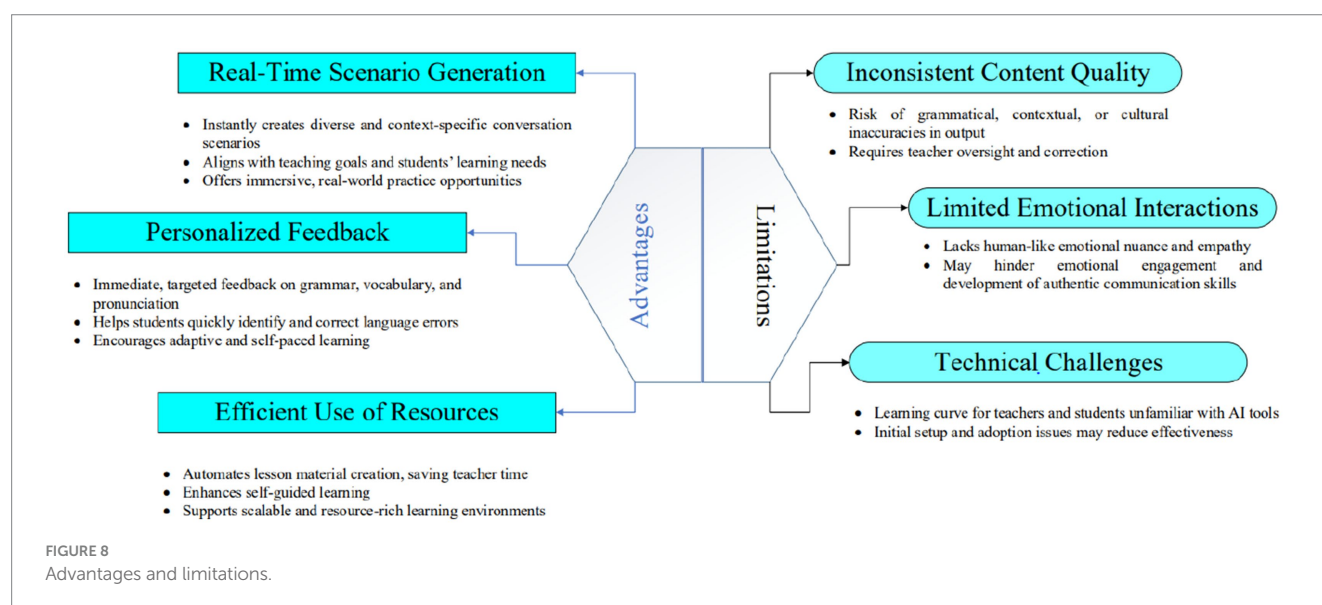
Despite these limitations, AIGC provides flexibility and innovation that are important for English conversation instructions. Its use is to fully exploit its benefits in educational settings to forward discovery and refinement (Figure 8).

5.2 Challenges in integrating technology and teaching

Besides, the AIGC provides outstanding advantages, but its integration in teaching has many challenges.

Technical adaptability: Many students and teachers are not familiar with the AIGC, especially during its initial stage of implementation. This differs in knowledge and usually needs proper training and institutional support, which demands both time and finance.

- **Content accuracy:** AIGC can sometimes be wrong or biased, which can lead to errors/misunderstandings of concepts during language learning. This can interrupt the learning and may cause misconceptions.
- **Overreliance on Technology:** Overreliance on AIGC may have harmful effects on the teacher's flexibility in course design, which reduces their creativity and ability to use their expertise. Moreover, the student may also become highly dependent on the technology and disengaged by deep cognitive processes that involve language acquisition.
- **Data privacy and ethics:** AIGC usually needs a collection of large amounts of student data that may cause concern about the privacy violations or data security. Ensuring proper compliance with rules, data safety, and moral standards is crucial for a significant reduction in risks.



To solve these hurdles, there is a need to develop clear guidelines for the proper use of technology and provide technical training for both students and teachers. Moreover, continuous research is also needed for maximizing its effectiveness with proper privacy and ethics (Figure 9).

5.3 Future prospects for intelligent teaching models

- **Multimodal Integration:** In the future, the teaching models will include the AIGC, AR, VR, and voice recognition for the development of a learning environment. All of these tools can provide Dynamic and interactive educational experiences. With the combination of different types of these tools, students can engage more deeply with the concepts of content.
- **Personalized Learning:** AI will enable future models to adapt to each student's learning preferences, interests, and proficiency levels. This individual approach will ensure that learning experiences suit individual needs. As a result, students will have more control over their educational routes.
- **Data-Driven Insights:** Continuous analysis of student performance will allow for accurate recommendations and results for predictions. These insights will help both students and teachers make data-informed decisions. This approach will improve learning efficiency and tailor instructions.
- **Evolution of Teacher and Student Roles:** Teachers will help students guide their learning, providing help along the way. Students will take more control over their learning and join more. This change will encourage a more independent and teamwork-centric learning environment.
- **Cooperation and global teaching:** AI-operated equipment will enable students to cooperate on boundaries, share insights, and learn from diverse approaches. Real-time interaction will connect learners with various cultures and backgrounds. This global cooperation will increase cross-cultural understanding and knowledge exchange.
- **Lifelong learning and adaptability:** Wise teaching models will support learning for a lifetime by continuously adapting to the changing needs of learners. AI will recognize when the learners

are ready to move forward and provide proper challenges. This flexibility will ensure that education is relevant in a person's life.

6 Conclusions and recommendations

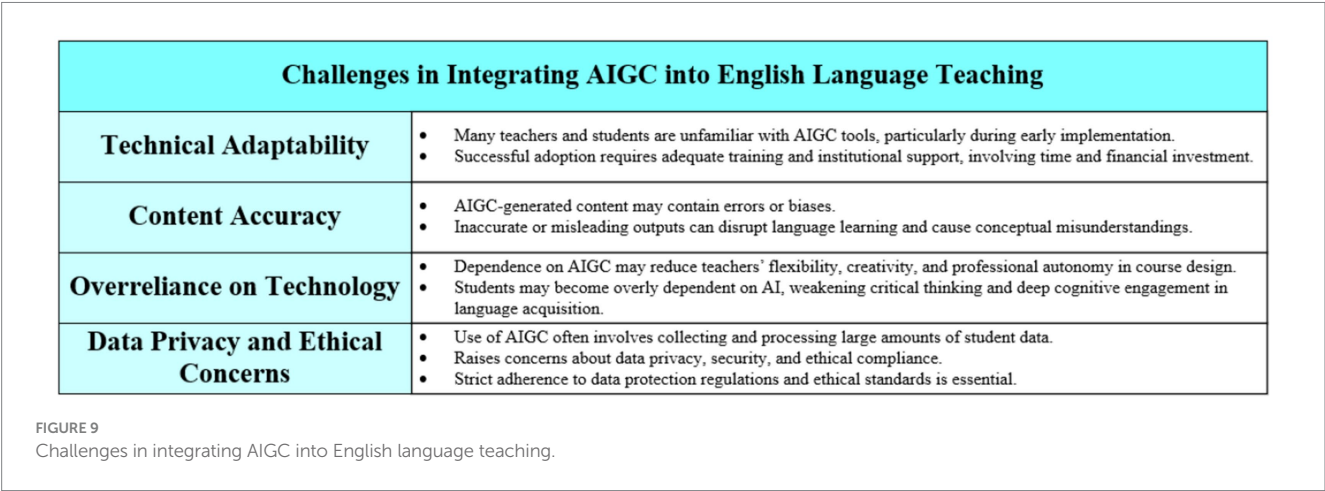
6.1 Research conclusion

This study examined the impact of AIGC-based digital scenario teaching on the English conversation instructions, which evaluates it from various perspectives, including teaching design, implementation, and student experience. Conclusions suggest that the AIGC technique can produce diverse and attractive status material, which can lead to noticeable improvement in students' speech clarity, grammatical accuracy, and communication flow. Additionally, it effectively learns students' interests and enhances their class participation. However, the study also highlights some challenges, including more dependence on technology and topical anomalies in material production, which can affect overall teaching effectiveness. In addition, students' adaptability to this model varies, with less familiarity among those who require additional support in the early stages. This research provides solid evidence to carry forward the theoretical understanding and practical application of digital scenario-based teaching in academic settings.

6.2 Practical recommendations

To effectively integrate AIGC-based digital scenario teaching, higher education institutions must consider the following approaches:

- **Enhance Teacher Training:** Organize regular training sessions and performance lessons to help teachers become efficient in using AIGC technology and become skilled in their teaching.
- **Refine Scenario Content:** Create a professional review system to ensure that the material generated is accurate and culturally suitable, and reduces any issues caused by technical errors.
- **Support Diverse Students:** Provide additional assistance to students who have limited technical skills or weak language abilities, which provides additional technical training and individual requirements to provide a teaching approach to individual needs.



- **Comprehensive Evaluation:** Use a combination of both quantitative and qualitative evaluations to widely evaluate students, ensuring that instructional methods can be adjusted on the basis of detailed responses.

By adopting these strategies, the institutes can maximize the effectiveness of AIGC technology, which can offer more attractive, personal, and efficient learning experiences to students.

7 Future research directions

In education, future research on AIGC can focus on improving the quality and cultural suitability of the material generated to address and ensure relevance. Comparative studies in subjects will help AIGC tailor for various academic fields. Research on the integration of AIGC with cross-cultural communication can increase students' global communication skills. Technology, morality, and data privacy concerns are important for the use of AI in responsible classes. Finally, the study on educational innovations and access will ensure that AIGC effectively supports diverse learners and teaching methods. In addition, longitudinal studies can assess the long-term impact of AIGC on students' results. To increase cooperation in the virtual environment, the teacher-student conversation through AIGC should be detected. Research will promote inclusiveness and equitable access to research education by adopting AIGC for diverse learning needs.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The study was approved by the ethical review committee of University of Gujrat, Punjab, Pakistan. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

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MY: Conceptualization, Investigation, Writing – original draft. II: Writing – review & editing, Methodology, Data curation. DE-D: Methodology, Supervision, Writing – review & editing. BA: Data curation, Formal analysis, Methodology, Writing – review & editing. UN: Data curation, Formal analysis, Methodology, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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