



# Conceptualizing the Fusion: An Exploratory Study on Embedding Generative AI within the TPACK Framework for Future Implementation in Applied College English Classrooms

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**Abstract:** Against the backdrop of digital education and the internationalization of higher education, innovative approaches to English listening and speaking instruction in applied undergraduate universities urgently require strong theoretical and technological support. This paper begins with foundational work for reform, conducting a survey and interviews on the current state of English listening and speaking courses for first-year non-English major students in applied universities. Their English proficiency ranges from A1 to B1 according to the Common European Framework of Reference for Languages (CEFR). The survey revealed several issues, including incomplete teaching technology in the classroom, overly procedural classroom teaching, untimely feedback on classroom activities and assignments, and slow student adaptation to certain learning environments. Based on these issues, this paper utilizes the core capabilities of generative artificial intelligence (GenAI) to empower the Technological Pedagogical Content Knowledge (TPACK) framework, initially constructing a "GenAI-TPACK Integrated Teaching Model Framework." This framework aims to dynamically combine technical knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK) to achieve four-dimensional innovation in the teaching objectives, processes, platforms, and evaluation of Applied English Listening and Speaking courses. It is a comprehensive and systematic theoretical model and operational blueprint that can be verified through subsequent teaching practice. Furthermore, the current research has laid a theoretical foundation for innovative integration, clarified the focus of the problem, and provided a preliminary analytical framework and model conception for the digital reform of English listening and speaking teaching in applied universities.

**Keywords:** generative artificial intelligence; TPACK framework; English listening and speaking; teaching model construction; applied universities; current situation survey

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## 1. Introduction

With the advancement of China's Education Modernization 2035 strategy and the accelerated internationalization of higher education, cultivating application-oriented talents with strong cross-cultural communication skills has become one of the core missions of application-oriented undergraduate institutions. English listening and speaking skills, as a key indicator of global competence, directly impact the quality of talent cultivation. However, the generally low English proficiency of students (between CEFR A1 and B1) poses a serious challenge to English listening and speaking courses in application-oriented universities. This reflects the complex learning situation of most students, characterized by weak English performance, varying learning levels, and diverse learning motivations. Relying solely on textbooks and teacher-centered teaching models is insufficient to meet the diverse needs and efficient output of the classroom, necessitating a re-empowerment and reform.

The TPACK framework integrates technology, pedagogy, and content knowledge, providing a meta-theoretical perspective for guiding the deep integration of these elements in teaching[1]. Current educational transformation is inseparable from the empowerment of rapidly developing generative artificial intelligence (GenAI). Its large language model (natural language understanding, generation, and interaction capabilities) makes it possible to construct highly contextualized, personalized, and interactive language learning environments. However, simply introducing technology without a scientific teaching theory and design often leads to the substantive content remaining unchanged while neglecting practical needs in pursuit of technological advancement. Therefore, the TPACK framework provides a solid foundation for reforming teaching theory. Gao demonstrated in his practice at Beijing Open University that the TPACK framework can effectively guide the system design of intelligent English teaching reform[2].

Therefore, this paper is dedicated to implementing innovative research on applied university English listening and speaking courses, exploring an innovative path empowered by artificial intelligence (GenAI) and guided by the TPACK framework. To break through existing classroom teaching models, this paper conducts empirical research and analysis on

target learning conditions and the current state of the course, and constructs the theoretical foundation for the "GenAI+TPACK" integrated teaching model framework, which enables practical application and case verification.

## 2. Literature Review and Theoretical Perspective

### 2.1 TPACK Framework: A Comprehensive Knowledge Foundation

The TPACK framework fundamentally changes the traditional relationship between technology, pedagogy, and content. They are no longer independent elements, but rather a unified whole, dynamically interacting and integrating in specific educational contexts. The TPACK framework consists of three basic elements: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technology Knowledge (TK), as well as four composite elements formed by the intersection of these three: Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK itself)[3]. To achieve synergistic collaboration among these seven elements and a paradigm shift from traditional to smart classrooms, Zhu designed a TPACK-based smart classroom for university English[3]. In university listening comprehension and English speaking instruction, TPACK requires instructors not to entirely focus on Content Knowledge (CK), Pedagogical Knowledge (PK), language comprehension, and presentation content, but rather to establish a comprehensive communicative and interactive environment and integrate it with the teaching process. This truly organically combines Technology Knowledge (TK) with content and environment.

### 2.2 Generative Artificial Intelligence: A Contextual Awareness Tool

Such applications of GenAI in education should be considered within the context of specific disciplines, as it is not a almighty. Liu et al. systematically explored the process of AI systems reshaping teaching, such as promoting the integration of instruction, training, and assessment for improving listening skills and English speaking, and focused on AI's assessment, generation, and interaction capabilities[4]. Xiong demonstrated that AI technology can enable personalized learning on a large scale at the National Open University[5]. The unique value of GenAI in language learning lies in its ability to generate real-time dialogue scenarios. These linguistics can both recreate real language scenarios and achieve personalization, serving as a good partner for language practice tools and content creation, and can always provide technical support for task-based and context-based teaching methods. Shoukat et al. believe that the TPACK model should be combined with AI applications, which is an important form of enhancing English learning engagement, such as personalized learning paths and interactive practice methods[6].

Current research in this area largely focuses on the localization and evaluation of TPACK theory[7] or the application of AI technology, particularly in foreign language teaching. However, pioneering integrated technology systems like GenAI incorporated into TPACK are insufficient for first-year non-English major students in applied undergraduate institutions, whose English proficiency varies and whose motivations are diverse. To ensure relevance and educational effectiveness, this study, based on thorough learning condition analysis and mature teaching theories, integrates GenAI technology to address this deficiency.

## 3. A Survey on the Current Status of College English Listening and Speaking Courses

### 3.1 Survey Design and Implementation

To accurately assess the current state of the curriculum, a questionnaire survey of 320 non-English major freshmen from the 2025 graduating class of Qingdao City University was conducted, collecting 298 valid questionnaires. In addition, interviews are also undertaken with eight experienced English teachers, specializing in both listening and speaking skills. The questionnaire survey covered multiple aspects, including teaching philosophy, resource utilization, curriculum design, technology integration, assessment methods, and learning experience.

### 3.2 Key Findings and Problem Identification

The survey data reveals several key problems in the current curriculum, which can be summarized into the following four points:

The application of technology is limited in scale, and its integration with teaching is too superficial: there is a disconnect between technology and pedagogy, or rather, between technology and subject knowledge. Although the use of intelligent learning platforms and multimedia devices is relatively widespread, the use of technology is often limited to PPT presentations or audio playback. There is also a phenomenon of using technology simply to achieve the goal of application, rather than using it as a tool for problem-solving. Teachers said they lacked a full understanding and skills to integrate new technologies

such as artificial intelligence (GenAI) into classroom teaching, and that the technology was not deeply integrated into basic teaching plans.

**A lack of personalized learning and a single-path teaching model:** The single-path teaching model, characterized by standardized lectures, group activities, and formulaic answers, remains the prevailing classroom practice. 76% of students believe that classroom activities fail to meet the learning needs of students at different levels. This appears to fail to meet the talent development goals of differentiated and personalized learning necessary for cultivating applied skills, as evidenced by A1-level students struggling to keep up with the pace of the class, while B1-level students lack motivation. This suggests that teaching methods based on Pedagogical Content Knowledge (PCK) are ineffective in addressing diverse learning environments.

**Delayed feedback and unclear skills development:** The ambiguity of formative assessment and the excessive weight given to final exams lead to long feedback cycles and an inability to provide precise feedback on relevant issues to each student. Timely and detailed analysis of each student's oral report is difficult; more specific feedback on pronunciation, fluency, and vocabulary usage is what students desire but is difficult to achieve. This is in stark contrast to the immediate and precise AI-based feedback[4].

**Delays in data-driven decision-making and functional disconnects between educational platforms:** Current learning management systems, resource repositories, and assignment submission platforms lack effective interoperability, engendering the formation of information silos. Educators face numerous obstacles in accessing comprehensive learning analytical data, including data on student pre-class preparation, classroom participation, and post-class learning activities, which in turn limits their ability to make data-driven instructional decisions and provide personalized instructional support.

These challenges stem from a disconnect or superficial integration between technology, pedagogy, and content knowledge, hindering the dynamic balance required by the TPACK framework. The solution proposed in this paper is based on this core insight, and subsequent steps will be elaborated in the following research.

#### **4. Development of an integrated education model based on GenAI and TPACK**

This study constructs an integrated education model based on GenAI and TPACK to address the aforementioned challenges. Within this framework, GenAI can transform from a non-core knowledge-sharing auxiliary tool into a collaborative and interactive partner, while TPACK, as a meta-structure and a solid foundation in pedagogical theory, enables its powerful functions such as content creation, natural interaction, multi-modal output, and data analysis to naturally empower the entire teaching process, meeting personalized learning needs, ensuring immediate feedback both in and out of class, and maintaining the relevance of the educational platform.

The GenAI-TPACK model, as the core framework of this study, truly enables the two-way empowerment and dynamic integration of educational concepts and technological tools. On the one hand, to ensure alignment between objectives and actual value output, GenAI applications are guided by the TPACK framework theory, guaranteeing that technology always serves clear subject objectives (CK) and effective teaching methods (PK). On the other hand, GenAI's capabilities expand and concretize the components of TPACK, particularly TCK, TPK, and TPACK themselves, making the integration of technologies more operational and innovative, and facilitating the true scaling of technology applications. These two elements can be dynamically integrated and iteratively adjusted according to specific educational contexts.

#### **5. Discussion and Conclusion**

This study achieved two main objectives: investigating the current state of English listening and speaking classes in applied universities and realizing the dynamic integration of theory and technology. Through evidence-based research, it was found that significant problems exist in technology integration, process design, and feedback in applied university English teaching (listening and speaking), stemming from the fragmentation of the three knowledge forms proposed by TPACK theory. Furthermore, based on these problems, a forward-looking "GenAI-TPACK integrated teaching model framework" was proposed, integrating TPACK theory and GenAI technology.

The value of this framework lies in its ability to systematically integrate technology and teaching models by organically linking the functions of these tools with educational goals, processes, platforms, and assessment methods. The GenAI-TPACK integrated teaching model framework is a systematic and contextualized approach, not simply a list of GenAI tools. Furthermore, this framework should be continuously adapted to the specific needs of universities of applied sciences to ensure its effectiveness and practicality.

## References

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- [1] Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education*, 9(1), 60-70.
- [2] Gao, S. (2023). Practice and exploration of intelligent college English teaching based on the TPACK framework. *Journal of Guangzhou Open University*, 23(3), 26-33.
- [3] Zhu, Y. (2025). Construction and practice of the TPACK-based college English smart classroom teaching model. *Journal of Wuxi Vocational Technical College*, 24(4), 35-41.
- [4] Liu, B., Hu, J., Liu, M., et al. (2025). AI-enabled integrated teaching, learning, and assessment for English listening and speaking: Models, strategies, and effectiveness verification. *China Educational Technology*, (1), 42-54.
- [5] Xiong, Y., Zheng, J. (2024). AI technology empowering large-scale personalized English teaching innovation practices. *Modern Educational Technology*, 34(9), 6-15.
- [6] Shoukat, S., Mamoon, R., & Arif, M. F. (2024). Enhancing language proficiency through TPACK model and AI applications: A study on effective integration strategies in English language instruction. *Pakistan Languages and Humanities Review*, 8(2), 540-554.
- [7] Wang, Q. (2019). A review of TPACK research in China (2009–2018). *Journal of Inner Mongolia Normal University (Educational Science Edition)*, 32(7), 67-74.

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