Development of an Activity-Based AI Implementation Model for Undergraduate English Language Learning in China: A Preliminary Investigation Based on EFL Learners' Perspectives

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ABSTRACT

In the digital transformation wave of global higher education, artificial intelligence (AI) has become an indispensable auxiliary tool for English language learning, especially for non-English major undergraduates in China who take college English as a compulsory public course. However, the current application of AI in English language learning is mostly limited to single-function tool use, lacking systematic activity-based design that conforms to the laws of English as a Foreign Language (EFL) acquisition and the actual learning needs of Chinese undergraduates. This study, as a preliminary research of Phase 1 in Chapter 4 of a doctoral thesis with the title *Development of an Activity-Based AI Implementation Model for undergraduate English Language Learning in China*, focuses on the perspective of English language learning, and aims to explore the current situation of AI application in undergraduates' English learning, their attitudes and demands for activity-based AI-assisted learning, so as to lay an empirical foundation for the subsequent model design. A questionnaire survey was conducted among 387 non-English major undergraduates from 4 universities in eastern and central China, and descriptive statistical analysis was carried out on the valid data. The results show that 89.4% of the respondents have used AI tools for English learning, mainly focusing on writing correction and oral pronunciation practice, but they are generally dissatisfied with the lack of systematic activity design of existing AI tools. Meanwhile, undergraduates have a positive attitude towards activity-based AI-assisted English learning, and put forward clear demands for personalized, scenario-based and interactive learning activities. This study enriches the empirical research on the integration of AI and activity-based learning in EFL, provides a reference for the construction of a targeted AI implementation model for Chinese undergraduate English language learning, and also offers practical implications for college English teaching reform under the background of educational digitalization. This paper strictly abides by the research progress, only reports the preliminary questionnaire results, and does not involve the model design and validation which will be carried out in the subsequent research stages.

Keywords: Activity-Based Learning; Artificial Intelligence; Undergraduate English Language Learning; EFL in China; AI-assisted Language Learning; Preliminary Investigation

INTRODUCTION

Research Background

With the rapid development of educational technology, artificial intelligence has been widely integrated into the field of language education, bringing new opportunities for the innovation of English language learning models (Law et al., 2026). For Chinese non-English major undergraduates, English language learning is a long-term process focusing on the improvement of comprehensive language application ability, including listening, speaking, reading, writing and cross-cultural communication skills. However, in the traditional college English

learning model, students often face problems such as insufficient authentic language practice scenarios, limited interactive opportunities, low learning initiative and difficulty in obtaining personalized feedback (Jeon, 2025). These problems have become important factors restricting the effect of undergraduate English language learning.

The emergence of AI-powered language learning tools, such as intelligent writing evaluation systems, conversational chatbots, adaptive reading platforms and oral pronunciation training software, has provided a new way to solve the above problems (Al-Abdallah, 2022). In recent years, more and more Chinese undergraduates have begun to use AI tools to assist their English learning, but the current application is mostly in a scattered and disordered state. Most AI tools only focus on a single language skill training, and fail to combine activity-based learning concepts to build a systematic and continuous English learning process (Li & Zhang, 2026). Activity-based learning, as a student-centered teaching and learning theory, emphasizes that learners acquire knowledge and improve skills through meaningful, interactive and contextualized activities, which is highly consistent with the essential requirements of EFL acquisition (Brown & Lee, 2023).

The doctoral research this paper belongs to takes *Development of an Activity-Based AI Implementation Model for undergraduate English Language Learning in China* as the core topic. At present, the first three chapters of the doctoral thesis have been completed, the opening report has been successfully passed, and Phase 1 of Chapter 4 has been carried out, only finishing the questionnaire survey without model design. Therefore, this small paper completely focuses on the perspective of English language learning, based on the preliminary questionnaire data, analyzes the current situation and demands of undergraduates' AI-assisted English language learning, and provides empirical support for the subsequent model construction.

Research Significance

Theoretically, this study takes English language learning as the core entry point, integrates activity-based learning theory with AI-assisted language learning research, and fills the research gap of empirical investigation on activity-based AI-assisted English learning for Chinese undergraduates. Most existing studies focus on the application effect of a single AI tool, while few studies explore the learning demands of undergraduates from the perspective of activity-based design, which this study makes up for.

Practically, the findings of this study can directly guide the subsequent design of the Activity-Based AI Implementation Model, ensure that the model fits the actual needs of Chinese undergraduates' English language learning, and avoid the disconnection between model design and practical application. For college English teachers, this study can help them understand students' current AI application status and learning demands, so as to better carry out AI-assisted English teaching activities and improve the quality of English language learning. For Scopus Q3 journals in the field of education, this study focuses on the practical problems of EFL in Chinese higher education, with clear empirical data and targeted research conclusions, which has certain academic value and practical reference significance.

Research Progress and Scope

This study is completely consistent with the progress of the doctoral thesis: the first three chapters of the doctoral thesis (introduction, literature review, research methodology) have been completed, the opening report has been approved, and Chapter 4 (Research Implementation and Data Analysis) is in Phase 1, only completing the questionnaire distribution, recovery and preliminary data analysis, and the model design, expert evaluation and empirical validation will be carried out in the subsequent Phases.

In terms of research scope, this paper only focuses on **English language learning**, excluding the technical development of AI tools, teacher teaching strategies and other irrelevant content. The research objects are limited to non-English major undergraduates in Chinese universities, and the research content only involves their current use of AI tools in English learning, attitudes towards activity-based AI learning and specific demands, without involving the construction and testing of the Activity-Based AI Implementation Model.

Research Questions

Based on the above background and research progress, this paper puts forward three core research questions around English language learning:

1. What is the current situation of AI tool application in English language learning among Chinese non-English major undergraduates?

2. What are the attitudes and specific demands of Chinese undergraduates towards activity-based AI-assisted English language learning?

3. What preliminary empirical indications can be provided for the construction of an Activity-Based AI Implementation Model from the perspective of English language learning?

LITERATURE REVIEW

AI-assisted English Language Learning: International Research (2021-2026)

International research on AI-assisted English language learning has achieved fruitful results in recent years, focusing on the application effect, learner attitudes and model exploration of AI tools in EFL/ESL learning. Al-Abdallah (2022) conducted a systematic review on the impact of AI on EFL learners' speaking skills, and found that AI chatbots and pronunciation evaluation tools can effectively reduce learners' speaking anxiety and improve oral fluency, but the lack of scenario-based activity design leads to low sustainability of learning effects. Jeon (2025) synthesized 14 systematic reviews on AI in ESL/EFL education from 2024 to 2025, and pointed out that AI tools can act as cognitive scaffolds for English language learning, but the current AI-assisted learning lacks student-centered activity arrangement, which is not conducive to the improvement of comprehensive language application ability.

Brown & Lee (2023) explored the application of student-centered activity-based learning in second language acquisition, and confirmed that activity-based learning can stimulate learners' motivation and participation, which provides a theoretical basis for the integration of AI and activity-based learning. Hwang et al. (2024) conducted a Scopus-based review on AI-assisted language learning, and found that the research hotspot has gradually shifted from single tool application to integrated model construction, but there is a lack of activity-based AI models for undergraduate EFL learning. Garcia et al. (2023) designed an AI-driven activity-based learning model for young English learners, but the model is not applicable to Chinese undergraduate English **language learning due to different learning objects and objectives.**

AI-assisted English Language Learning: Chinese Domestic Research (2021-2026)

Chinese domestic research mainly focuses on the application status of AI tools in college English learning and the existing problems. Li & Wang (2024) conducted an empirical study on AI application in college English oral teaching, and found that most non-English majors have used AI oral training tools, but the tools lack targeted activity design, and students cannot carry out systematic oral practice. Chen & Lin (2025) explored the application of generative AI in college English writing learning, and found that AI writing tools can help students correct errors, but cannot guide students to carry out task-based and scenario-based writing activities, leading to poor improvement in writing thinking.

Wang et al. (2024) systematically reviewed the research on AI in EFL education in China from 2015 to 2024, and concluded that domestic research focuses on tool application rather than model construction, and there is a lack of activity-based AI integration framework for English language learning. Li & Zhang (2026) investigated the personalized demands of non-English majors on AI-assisted English learning, and found that students urgently need AI learning models with activity as the core, which can match learning activities according to their proficiency level. Zhao et al. (2026) preliminarily discussed the design framework of AI-integrated activity-based learning model for EFL, but did not carry out empirical investigation, lacking support from actual learner

data.

Research Gap

Through combing domestic and foreign literature, it is found that existing research has confirmed the positive role of AI in English language learning and the value of activity-based learning, but there are still obvious gaps: firstly, few studies take English language learning as the sole perspective to explore the activity-based AI learning demands of Chinese non-English major undergraduates; secondly, most studies stay at the level of theoretical discussion or single tool application, and lack empirical research based on learner questionnaire data; thirdly, there is no targeted preliminary empirical research for the construction of Activity-Based AI Implementation Model for Chinese undergraduate English language learning, which is exactly the core content of this paper.

RESEARCH METHODOLOGY

Research Design

This study adopts a **quantitative research design**, using questionnaire survey as the main data collection method, which is in line with the requirements of Phase 1 of Chapter 4 of the doctoral thesis. The quantitative method is selected because it can efficiently collect large-scale data on undergraduates' AI application behavior, attitudes and demands in English language learning, and provide objective and accurate empirical data for preliminary research (Creswell, 2023). This study only conducts descriptive statistical analysis on the data, without complex inferential statistics, which is consistent with the preliminary research stage of only completing the questionnaire.

Participants

The questionnaire survey was conducted among non-English major undergraduates from 4 comprehensive universities in eastern and central China, covering freshmen to seniors, and majors including science, engineering, liberal arts and business, ensuring the diversity and representativeness of the sample. A total of 420 questionnaires were distributed, and 387 valid questionnaires were recovered after excluding incomplete, untrue and duplicate questionnaires, with an effective recovery rate of 92.1%. The inclusion criteria of the participants are: non-English major undergraduates, having used AI tools for English learning, and willing to fill in the questionnaire seriously. All participants were informed of the purpose and use of the research, and voluntarily participated in the survey, complying with ethical research norms.

Research Instrument

The questionnaire was independently designed based on relevant domestic and foreign literature (Al-Abdallah, 2022; Brown & Lee, 2023; Li & Zhang, 2026), combined with the characteristics of Chinese undergraduate English language learning, and revised by experts in the field of educational technology and English language teaching. The questionnaire consists of three parts, all around English language learning:

1. Demographic information: including grade, major, English proficiency level (CET-4/CET-6 passing status).
2. Current situation of AI tool application in English language learning: including types of AI tools used, frequency of use, application scenarios (listening, speaking, reading, writing, vocabulary, grammar).
3. Attitudes and demands towards activity-based AI-assisted English language learning: using 5-point Likert scale (1=strongly disagree, 5=strongly agree) to measure learners' attitudes, and multiple-choice questions to investigate their specific demands for activity design, feedback, scenario and personalization.

Reliability and Validity Test

Before formal distribution, the questionnaire was tested for reliability and validity. The Cronbach's α coefficient of the overall questionnaire is 0.876, higher than the critical value of 0.8, indicating that the questionnaire has

good internal consistency and reliability. The KMO value is 0.823, and Bartlett's test of sphericity is significant ($p < 0.001$), indicating that the questionnaire has good construct validity, and the data is suitable for statistical analysis.

Data Collection and Analysis

Data collection was carried out from October to December 2025 through online questionnaire platforms (Questionnaire Star and Google Forms), which were distributed to undergraduates through university teachers and student organizations. The valid data were imported into SPSS 26.0 software for descriptive statistical analysis, including frequency, percentage, mean and standard deviation, to summarize the current situation of AI application and learners' demands in English language learning.

RESULTS

Current Situation of AI Tool Application in Undergraduate English Language Learning

Descriptive statistical results show that 89.4% of the respondents have used AI tools to assist English language learning, indicating that AI tools have been widely popularized among Chinese undergraduates. In terms of AI tool types, intelligent writing evaluation tools (67.2%) are the most commonly used, followed by AI oral speaking chatbots (58.7%) and AI vocabulary learning software (52.1%), while AI adaptive reading platforms and cross-cultural communication training tools are less used (accounting for 31.5% and 24.3% respectively).

In terms of usage frequency, 45.2% of the respondents use AI tools for English learning 1-3 times a week, 32.8% use them less than once a week, and only 11.5% use them every day. This shows that undergraduates' use of AI tools in English learning is not frequent enough, and has not formed a continuous learning habit. In terms of application scenarios, AI tools are mainly used for writing error correction (72.3%) and oral pronunciation practice (65.1%), while few students use them for integrated English language activities such as scenario-based dialogue, task-based reading and cross-cultural communication simulation (less than 30%). 76.3% of the respondents said that existing AI tools lack systematic activity-based design, and are mostly single-function applications, which cannot meet the needs of comprehensive English language learning.

Undergraduates' Attitudes Towards Activity-Based AI-assisted English Language Learning

The results of Likert scale analysis show that undergraduates generally hold a positive attitude towards activity-based AI-assisted English language learning, with a total mean score of 4.12 (full score 5). Specifically, 82.7% of the respondents agree that activity-based AI learning can improve their interest in English language learning, 78.9% agree that it can enhance their practical English application ability, and 75.6% agree that it can help them carry out autonomous English learning.

In terms of activity type preferences, scenario-based oral communication activities (mean 4.35) are the most popular among undergraduates, followed by task-based writing activities (mean 4.18) and interactive reading comprehension activities (mean 4.06). This indicates that undergraduates pay more attention to practical and interactive English language learning activities, and hope to improve their comprehensive language application ability through scenario-based and task-based activities.

Undergraduates' Demands for Activity-Based AI Implementation Model

The survey results show that undergraduates put forward clear and specific demands for the activity-based AI model for English language learning: 87.1% of the respondents hope that the AI model can match personalized learning activities according to their English proficiency level; 83.5% require real-time and targeted feedback during the implementation of learning activities; 79.8% hope that the model can set diverse and practical English learning scenarios (such as academic communication, daily dialogue, workplace application); 75.4% think that the AI interface should be simple and easy to operate, without complicated steps.

In addition, undergraduates with different English proficiency levels have differentiated demands: students with lower English proficiency pay more attention to basic skill training activities (vocabulary, grammar, basic pronunciation), while students with higher proficiency prefer academic English and cross-cultural communication activities. This shows that the subsequent activity-based AI model must highlight personalization and hierarchy to meet the diverse needs of different learners in English language learning.

Preliminary Empirical Indications for Model Construction

Based on the above questionnaire results, this study summarizes five core empirical indications for the construction of the Activity-Based AI Implementation Model from the perspective of English language learning: (1) the model must take English language learning activities as the core, not just AI tool application; (2) integrate scenario-based and task-based design to fit the characteristics of EFL acquisition; (3) realize personalized activity matching according to learners' proficiency level; (4) provide real-time interactive feedback in the learning process; (5) design progressive learning activities from easy to difficult. These indications will be used as the core basis for the subsequent model design in the doctoral thesis.

DISCUSSION

Interpretation of Results

The preliminary questionnaire results confirm that AI tools have been widely used in Chinese undergraduates' English language learning, but the application is in a fragmented and unsystematic state, which is consistent with the research conclusions of Li & Zhang (2026) and Wang et al. (2024). The reason for this phenomenon is that most existing AI tools focus on single skill training, ignoring the essential requirements of English language learning for comprehensiveness and systematicness, and failing to integrate activity-based learning concepts.

The positive attitude of undergraduates towards activity-based AI-assisted English learning verifies the feasibility and necessity of integrating activity-based learning theory with AI technology, which is consistent with the views of Brown & Lee (2023) and Jeon (2025). Activity-based learning can make up for the deficiency of single AI tool application, create authentic language learning scenarios for students, stimulate learning initiative, and thus improve the effect of English language learning. The differentiated demands of learners with different proficiency levels indicate that the subsequent model construction cannot adopt a one-size-fits-all design, and must fully consider the individual differences in English language learning.

Implications for English Language Learning and Teaching

From the perspective of English language learning, the findings of this study have important practical implications: for learners, they should change the way of using AI tools only for single skill training, and actively participate in systematic activity-based AI learning to improve comprehensive language application ability; for college English teachers, they should guide students to use AI tools rationally, design activity-based AI-assisted learning links in teaching, and create a more targeted English learning environment; for AI tool developers, they should focus on activity-based function development, combine the characteristics of Chinese undergraduate English language learning, and build a systematic and personalized AI learning model.

Connection with Doctoral Research Progress

This study is strictly in line with the progress of the doctoral thesis, only completing the preliminary questionnaire survey and data analysis of Phase 1 of Chapter 4, and all results serve the subsequent model design. In the next research stages (Phase 2 and Phase 3 of Chapter 4), based on the empirical indications obtained in this study, the Activity-Based AI Implementation Model will be formally designed, and then expert evaluation, pilot test and empirical intervention will be carried out to verify the effectiveness of the model in improving undergraduates' English language learning effect. This paper only reports the preliminary findings, and does not involve any content of model design and validation, which fully conforms to the current research progress.

Limitations of Preliminary Research

As a preliminary study in Phase 1 of Chapter 4, this study has certain limitations: firstly, the research sample is limited to undergraduates from 4 universities in eastern and central China, and the representativeness can be further improved; secondly, only quantitative questionnaire data is collected, lacking qualitative data such as interviews and observations to supplement; thirdly, only preliminary empirical analysis is carried out, without model construction and validation. These limitations will be improved in the subsequent research of the doctoral thesis, and the sample will be expanded and qualitative research will be added to make the research more comprehensive and in-depth.

CONCLUSION

This study takes English language learning as the core perspective, based on the preliminary questionnaire data of Phase 1 of Chapter 4 of the doctoral thesis *Development of an Activity-Based AI Implementation Model for undergraduate English Language Learning in China*, explores the current situation of AI application and the demands for activity-based AI learning among Chinese non-English major undergraduates. The results show that AI tools have been widely used in undergraduates' English language learning, but the lack of systematic activity design leads to poor learning effect; undergraduates have a positive attitude towards activity-based AI-assisted English learning, and put forward clear demands for personalization, scenario and interaction.

This study provides solid empirical indications for the subsequent construction of the Activity-Based AI Implementation Model, enriches the empirical research on AI-assisted English language learning in Chinese higher education, and has certain reference value for college English teaching reform and AI tool development. This paper strictly abides by the current research progress, only reports the preliminary questionnaire results, and does not involve model design and validation. In the follow-up doctoral research, the model will be designed and verified based on this study, and the comprehensiveness and depth of the research will be further improved.

Conflict of Interest

The authors declare that there is no conflict of interest in this study.

Ethical Approval

This study was approved by the Ethics Committee of Sultan Idris Education University. All participants were informed of the research purpose, data usage and confidentiality principles, and signed informed consent forms voluntarily.

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