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CET-4 Preparation Challenges and Perceived Needs for AI Agent Support: A Survey of Chinese University Students

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Abstract

Despite the growing use of AI agents in foreign language education, Chinese students preparing for the College English Test Band 4 (CET-4) still lack systematic learning support. A questionnaire survey conducted as part of this study identified three major challenges: rigid learning pathways resulting from inadequate assessment of learners' needs and abilities; preparation materials with uniform difficulty levels that fail to accommodate individual differences in proficiency; and delayed marking of open-ended responses and answers to students' questions, which undermine the usefulness of feedback. Listening was identified as the weakest skill by 86.5% of respondents. Drawing on the questionnaire findings, this study proposes an AI-agent-based platform design for personalized CET-4 preparation across vocabulary, listening, reading, writing, and translation. The design integrates learning diagnosis, adaptive study planning, graded reading materials, and on-demand feedback. It offers a learner-informed framework for developing AI-supported CET-4 preparation tools, whose usability and educational effectiveness require further evaluation.

Keywords: AI Agents, College English Test Band 4 (CET-4), Personalized Learning, Needs Analysis, Chinese College Students

Introduction

Performance on the College English Test Band 4 (CET-4) is an important consideration in further education and employment opportunities for many non-English majors in China. The *Guidelines on College English Teaching (2020 Edition)* require college English instruction to follow the principles of differentiated guidance and teaching tailored to students' individual needs (Ministry of Education's Advisory Committee on College Foreign Language Teaching, 2020, pp. 2–3). In practice, however, large class sizes and limited instructional time often make it difficult for teachers to accommodate differences in students' proficiency levels. According to Peng (2024), without targeted guidance for out-of-class test preparation, students commonly resort to repetitive practice with test questions without clear learning goals.

Educational AI agents powered by large language models (LLMs) offer a new approach to addressing this challenge. Drawing on Xu and Zhao (2025), these agents are interactive systems that integrate LLMs, knowledge bases, and task-execution tools to provide personalized content recommendations, immediate feedback, and learning pathway optimization. This makes the preparation of CET-4 shift from from question-bank retrieval to generative interaction between learners and AI. A growing body of research has examined these applications. Early studies outside China explored personalized instructional systems based on learner models (Xu et al., 2005). More recently, models such as ChatGPT have been used to support college English writing and automated assessment. Some studies suggest that their feedback is comparable to, or even better than, human feedback on certain dimensions, although concerns about consistency and appropriateness remain (Ramirez & Esparrell, 2024; Baha et al., 2024). Existing research has primarily focused on three areas: assessment of learners' proficiency and learning needs (Wang et al., 2025; Habeeb et al., 2025), learning pathway development (Chen, 2017; Yu, 2024), and feedback and assessment (Chen et al., 2025).

Within the CET-4 context, Yu (2022) explored a personalized learning platform for vocabulary development. Although this study extends technology-supported language learning to CET-4 preparation, its focus is limited to vocabulary learning. More broadly, the literature reviewed above primarily addresses general language learning or individual skill development, with an emphasis on technical feasibility and improvements to specific functions. Empirical research examining learners' needs specifically for CET-4 preparation remains limited. A related gap concerns the design of AI agent-supported learning pathways informed by these needs that integrate listening, reading, writing, and translation with vocabulary learning.

To address this gap, this study uses a questionnaire survey to examine Chinese university students' self-reported challenges in CET-4 preparation and their perceived needs for AI agent support. The findings aim to inform the development of learner-centered support for CET-4 preparation and provide an empirical basis for future AI-supported learning tools.

Method

This study adopted a cross-sectional questionnaire survey design to examine Chinese university students' self-reported challenges in preparing for CET-4 and their perceived needs for AI agent support. A learner needs analysis approach was used to identify areas in which students reported difficulties and the types of support they considered useful for test preparation. The study focused on describing these challenges and perceived support needs. The findings were intended to inform future research and the design of AI-supported CET-4 preparation tools.

Data Collection

Participants were non-English-major undergraduates at a local application-oriented university in China. Convenience sampling was used to recruit first- and second-year students, and participation was voluntary. Data were collected in June 2026 through an online questionnaire distributed via Wenjuanxing.

A total of 204 responses were received. Responses completed in less than one minute were considered excessively rapid, and responses were also screened for patterned answering. Following screening, four responses were excluded, leaving 200 responses for analysis (98.04% of all responses received).

The final sample comprised 162 first-year students (81.0%) and 38 second-year students (19.0%). Most respondents (n = 167, 83.5%) reported that they had not previously taken CET-4, whereas 33 (16.5%) had taken the test at least once. The sample therefore primarily represented students who had not yet taken CET-4, while also including those with prior test-taking experience.

Questionnaire Development

A researcher-developed questionnaire was used to examine students' CET-4 preparation challenges and perceived needs for AI agent support. It comprised three sections: (1) student background information, (2) CET-4 preparation practices and challenges, and (3) perceived needs for AI agent support functions. Items in the latter two sections used five-point Likert-type response formats. For statements about preparation practices and challenges, responses ranged from 1 ("not at all true of me") to 5 ("completely true of me"). For items concerning support functions, responses ranged from 1 ("not needed at all") to 5 ("very much looking forward to it"). The content and organization of these sections are described below.

2.2.1 CET-4 Preparation Practices and Challenges

This section examined students' self-reported preparation practices and challenges. It contained nine items organized into three content domains, as presented in Table 1.

Table 1
Structure of the CET-4 Preparation Practices and Challenges Questionnaire Section

No.	Assessment Focus	Content Domain	Number of items
1	Challenges in self-directed learning	Learning planning and strategies	3
2	Alignment of instructional resources with students' learning needs	Personalized guidance and resources	3
3	Delays in receiving learning feedback	Learning feedback and interaction	3

Perceived Needs for AI Agent Support Functions

This section assessed students' perceived needs for key functions of an AI-supported learning platform. It comprised eight items organized into three content domains, as presented in Table 2.

Table 2
Structure of the Questionnaire Section on Perceived Needs for AI Agent Support Functions

No.	Assessment Focus	Content Domain	Number of Items
1	Needs for personalized learning pathways, precise assessment of learners' current proficiency and learning needs, and adaptive recommendations of practice questions	Intelligent learning diagnosis and pathway planning	3
2	Needs for AI-powered, customized learning resources, such as simplified versions of past CET-4 reading materials and generated vocabulary-learning content in context	AI-supported graded reading and content generation	2
3	Needs for frequent interactive support, such as automated assessment of constructed-response tasks and round-the-clock answers to learning-related questions	Immediate feedback and AI teaching assistance	3

Content Review and Preliminary Reliability Assessment

To assess the questionnaire's content validity, three experts in college English teaching were invited to review the instrument. Before the main survey, a pilot study was conducted with 30 students to examine its internal consistency. The overall Cronbach's alpha for the questionnaire was .925, indicating high internal consistency among the items included in the analysis. This finding provided preliminary evidence of internal consistency in the pilot sample but did not, by itself, establish the questionnaire's validity or the stability of scores over time.

Ethical Considerations

This study involved a questionnaire survey on students' CET-4 preparation experiences and perceived needs for AI agent support. Participants were informed of the study's purpose and provided informed consent before completing the questionnaire. Participation was voluntary, and no personally identifying information was collected. Participants were not taught by the researchers. No formal ethics review was conducted, as the researchers' institution did not have a research ethics committee at the time of data collection.

Results and Discussion

Self-Reported Areas of Weakness: Greater Difficulties in Listening and Productive Skills

Students' responses to the multiple-response question on their perceived areas of weakness revealed an uneven pattern across language skills. As shown in Figure 1, listening comprehension was the most frequently reported area of difficulty (86.5%), followed by writing (56.5%) and translation (46%). Reading comprehension was selected least frequently (28%). These findings suggest that respondents perceived fewer difficulties in reading than in listening, writing, and translation. The pattern points to a perceived need for support in listening comprehension and productive skills, although these self-reports do not provide a direct measure of students' proficiency.

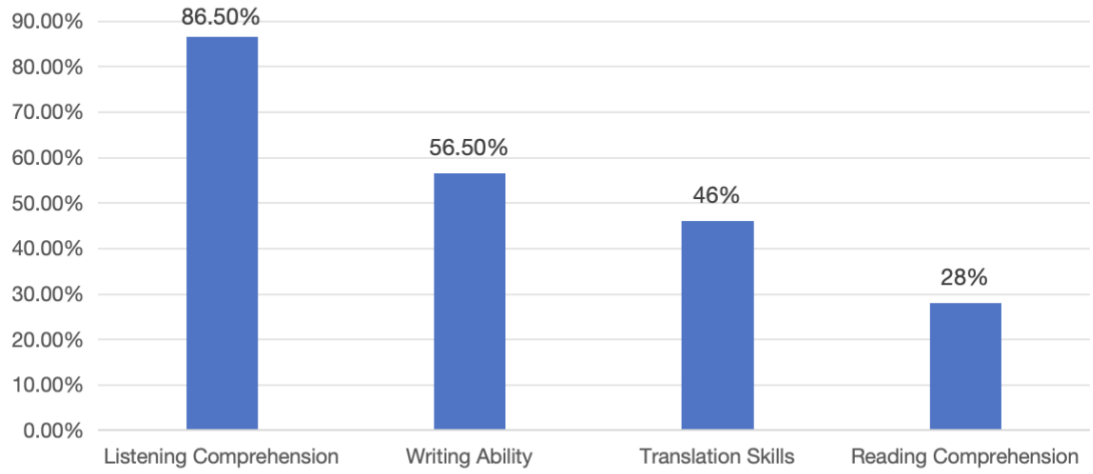

Figure 1. Distribution of Respondents' Self-Reported Areas of Weakness in CET-4 Preparation

Note. Respondents could select more than one option; therefore, percentages may sum to more than 100%.

Key Challenges in CET-4 Preparation

The preceding findings identified listening, writing, and translation as the most frequently reported areas of weakness. The following results describe students' broader preparation challenges across three content domains: learning planning and strategies, personalized guidance and resources, and learning feedback and interaction. Unless otherwise stated, the percentages reported below represent the combined proportions of respondents selecting "mostly true of me" or "completely true of me."

Learning Planning and Strategies

A substantial minority of respondents reported difficulties in planning their preparation and identifying their learning needs. Specifically, 41.0% indicated that they lacked a clear revision plan and often felt unsure where to begin. A further 33.0% reported difficulty accurately assessing their current English proficiency and gaps in their knowledge. In addition, 29.5% reported frequently spending time on material they had already mastered while overlooking areas of weakness. These responses suggest perceived difficulties in setting study priorities, assessing learning needs, and allocating preparation time effectively.

Personalized Guidance and Resources

Respondents also reported difficulties obtaining guidance and materials suited to their individual needs. Specifically, 33.5% indicated that large college English classes offered limited guidance on their individual weaknesses. Meanwhile, 38.5% found past CET-4 papers too difficult and reported difficulty finding intermediate learning materials appropriate to their current proficiency. Just over half of the respondents (51.5%) expressed a desire for a teacher or teaching assistant who could recommend suitable materials as their preparation progressed. Together, these findings indicate concerns about the suitability of available resources and a perceived need for ongoing, personalized guidance.

Learning Feedback and Interaction

Feedback and access to assistance constituted another area of concern. For writing and translation tasks, 39.0% of respondents reported difficulty obtaining timely, detailed

corrections, including feedback on grammatical errors. After completing practice tests, 36.0% reported that they often knew their scores but did not understand the reasons for their errors or how to approach the questions. In addition, 32.0% reported having no one readily available to answer questions about complex sentences or grammar during out-of-class study. These responses suggest perceived gaps in access to explanatory feedback and timely assistance during CET-4 preparation.

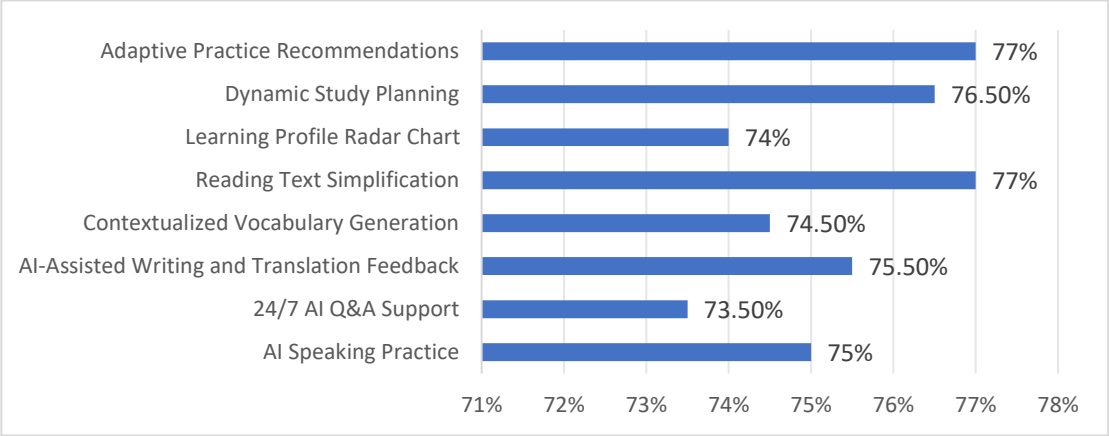

Figure 2. Percentage of Respondents Expressing Positive Expectations for Each Educational AI Agent Function

Note. Percentages combine responses of "Moderately looking forward to" and "Very much looking forward to."

Expectations for AI Agent Support Functions

Respondents expressed positive expectations for the proposed AI-supported learning functions. For each function, more than 73% selected either "moderately looking forward to it" or "very much looking forward to it." These combined percentages are reported below as indicators of positive expectations. Figure 2 presents the results for all eight functions.

Intelligent Learning Diagnosis and Pathway Planning

Within this domain, adaptive recommendations of practice questions, dynamic study plans, and radar charts displaying learners' proficiency profiles received positive responses from 77.0%, 76.5%, and 74.0% of respondents, respectively. These findings indicate interest in support for selecting practice activities, adjusting study plans, and visualizing learning needs. At the aggregate level, these preferences are consistent with the previously reported difficulties in planning and self-assessment. However, the descriptive results do not establish whether students reporting these difficulties were also those expressing interest in the corresponding functions.

AI-Supported Graded Reading and Content Generation

Simplified reading materials and contextualized vocabulary-learning content received positive responses from 77.0% and 74.5% of respondents, respectively. These results suggest interest in materials adapted to learners' proficiency levels and in vocabulary learning situated in meaningful contexts (Zhang, 2020). Considered alongside the reported difficulty of finding suitable preparation materials, these preferences identify potential directions for

resource development. Whether AI-generated or adapted materials improve comprehension or reduce frustration remains to be examined empirically.

Immediate Feedback and AI Teaching Assistance

Automated feedback on writing and translation and round-the-clock AI question answering received positive responses from 75.5% and 73.5% of respondents, respectively. These preferences are consistent with the reported concerns about delayed feedback and limited access to assistance during out-of-class study (Tang & Wei, 2019). In addition, 75.0% expressed positive expectations for AI-supported speaking practice. This finding indicates interest in conversational interaction, although it should be distinguished from support directly targeting the listening, reading, writing, and translation components examined in this study.

Overall, respondents expressed positive expectations across all eight proposed functions, with percentages ranging from 73.5% to 77.0%. The findings suggest perceived demand for personalized planning, adapted learning resources, and interactive feedback. They provide a learner-informed basis for considering these functions in future AI-supported CET-4 preparation tools, but do not establish students' actual adoption of such tools or their effectiveness in improving learning outcomes.

The findings on learners' expectations provide a context-specific perspective on the potential of chatbot-supported language learning. Huang et al. (2022) identified technological and pedagogical affordances of language-learning chatbots. This provides a foundation for understanding the types of assistance these tools can offer. Building on this synthesis, the present study examines how learners view specific support functions in CET-4 preparation and uses their responses to inform platform design. The proposed coverage also responds to an imbalance identified by Lo et al. (2024), whose review found that empirical research on ChatGPT in ESL/EFL education concentrated largely on writing. By considering vocabulary, listening, reading, writing, and translation within a common preparation framework, the present study addresses broader skill coverage at the design level. Its value lies not simply in including more functions, but in using learner-reported difficulties and expectations to inform the selection of support features across these areas. This broader scope, however, does not establish the effectiveness of the proposed functions.

The findings also clarify the distinction between identifying design requirements and evaluating adaptive learning support. Jiang et al. (2022) developed a data-driven approach to personalized learning path planning based on cognitive diagnostic assessments in MOOCs. In contrast, the present study provides questionnaire-based evidence to inform whether adaptive planning should be included in a CET-4 preparation platform, rather than determining how an individual learner's path should be adjusted. Such adjustments would require individual performance and learning-process data beyond the evidence collected here. A related distinction concerns the timing of learners' perceptions. Whereas Van Horn (2024) examined students' perceptions within a semester-long context of ChatGPT use, the present study investigates expectations for proposed support functions. These expectations offer evidence for initial design decisions, but should not be equated with post-use satisfaction, sustained adoption, or learning gains. Subsequent evaluation is therefore needed

to determine whether students use the functions as anticipated and whether the support addresses their reported preparation difficulties.

Implications for AI-Supported CET-4 Preparation

The findings suggest several directions for designing AI-supported CET-4 preparation tools. Respondents reported difficulties in planning, accessing suitable resources, and obtaining timely feedback, alongside positive expectations for all eight proposed AI functions. These results provide a preliminary, learner-informed basis for design rather than evidence that an AI agent would resolve the reported difficulties. The following implications should therefore be treated as propositions for development and evaluation.

Supporting Planning Through Actionable Learning Diagnosis

AI-supported preparation could connect the identification of learning needs with specific study actions. Respondents' reported difficulties in assessing their proficiency and allocating study time suggest that displaying a proficiency profile alone may be insufficient. A diagnostic dashboard could instead link identified weaknesses to manageable learning goals, recommended activities, and subsequent opportunities to review progress.

Such recommendations should draw on multiple sources of evidence, including task performance, recurring errors, and learners' own goals, rather than treating a single assessment as a definitive diagnosis. Students should also be able to understand and adjust recommended plans. This approach would position the agent as support for self-regulation rather than a substitute for learners' decision-making.

Providing Scaffolding While Maintaining Alignment With CET-4 Tasks

Interest in simplified reading materials and contextualized vocabulary content suggests a potential role for AI in bridging the gap between learners' current proficiency and examination demands. A platform could offer graduated versions of reading passages, contextual explanations, and targeted practice before directing students back to authentic CET-4 materials. Simplification should function as temporary support, not permanently replace engagement with examination-level texts.

Generated materials would require checks for linguistic accuracy, preservation of meaning, and alignment with intended learning objectives. Moreover, listening was the most frequently reported area of weakness, yet the proposed functions did not explicitly include dedicated listening support. Future needs assessment should therefore examine preferences for listening-specific features, such as segmented playback, optional transcripts, and explanations of comprehension errors. Interest in AI speaking practice should not be treated as sufficient evidence of demand for, or effectiveness in, listening support.

Making Feedback Explanatory and Usable

The reported difficulties in understanding errors suggest that feedback should extend beyond scores or corrected answers. For writing and translation, an AI agent could identify a limited number of high-priority issues, explain them in accessible language, and prompt students to revise their work. Follow-up tasks could then examine whether students can apply the feedback independently.

Similarly, on-demand question answering could offer graduated hints and explanations rather than immediately supplying complete solutions. These features would create opportunities for formative use of feedback, although their educational value would depend on feedback accuracy and students' engagement with it. Teacher review or escalation routes would remain important for ambiguous questions and potentially misleading AI responses.

Evaluating Use and Learning Before Wider Implementation

The consistently positive expectations do not establish actual adoption or justify a clear ranking of development priorities, given the small differences between the reported percentages. Initial development should combine these preferences with the severity of learning difficulties, technical feasibility, accessibility, and the consequences of inaccurate output. Teacher involvement would be valuable in reviewing materials and defining appropriate boundaries for automated assistance.

A staged pilot should assess not only satisfaction but also sustained use, feedback uptake, planning behavior, and performance on relevant CET-4 tasks. Evaluation should include students with different proficiency levels and prior test-taking experiences. Any collection of learning profiles or written work should also follow clear consent and data-protection procedures. Given the single-institution convenience sample, broader implementation would require further needs assessment and evaluation across more diverse settings. Ultimately, the aim should be to determine whether AI support improves preparation processes and learning outcomes, rather than merely delivering functions that students initially find appealing.

Conclusion

This study investigated self-reported challenges and expectations for AI-supported CET-4 preparation among non-English-major undergraduates at a local application-oriented university in China. The findings identified perceived difficulties in study planning, access to appropriate learning resources, and timely feedback. Respondents also expressed positive expectations for personalized learning diagnosis, adaptive recommendations, AI-generated learning materials, and interactive assistance. These findings informed the design of a proposed AI-agent-based platform for personalized CET-4 preparation.

The present study contributes to research on AI-supported language learning. Specifically, it provides context-specific evidence of learners' self-reported CET-4 preparation difficulties and expectations for educational AI functions. This evidence clarifies the forms of support perceived as relevant by the surveyed students and informs functional design in an examination-oriented language-learning context. The contribution lies in establishing a learner-informed basis for platform development and subsequent evaluation.

The study's main contribution lies in translating learner-reported needs into a context-specific platform design. The proposed platform integrates learning diagnosis, adaptive study planning, graded reading materials, and on-demand feedback. Within this design, a multi-level reading generation mechanism is intended to bridge the gap between learners' current proficiency and the demands of authentic CET-4 materials. An AI teaching assistant is designed to provide feedback on writing and translation and respond to learning-related

questions, while performance data would inform adjustments to recommended learning pathways.

These functions represent design responses to the identified needs rather than demonstrated improvements in learning. Given the single-institution convenience sample and the reliance on self-reported data, the findings should be interpreted cautiously. Future research should evaluate the platform's usability, the accuracy of its generated materials and feedback, and its effects on preparation behavior and CET-4 performance.

Limitations

This study has several limitations. First, participants were recruited through convenience sampling with voluntary participation at a single application-oriented university in China. The sample consisted predominantly of first-year students and students who had not previously taken CET-4. This composition limits the generalizability of the findings to students at other institutions or with different preparation experiences.

Second, the cross-sectional questionnaire captured self-reported difficulties and expectations rather than objectively assessed proficiency or observed learning behavior. Positive expectations for the proposed AI functions should not be interpreted as evidence of actual adoption or educational effectiveness.

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