

An Investigation and Research on English Student Teachers' Literacy and Application of Artificial Intelligence

Liu Yang

Jing Hengyi School of Education, Hangzhou Normal University, China

Received: 25 Aug 2026; Received in revised form: 23 Sep 2026; Accepted: 30 Sep 2026; Available online: 06 Oct 2026

©2026 The Author(s). Published by Infogain Publication. This is an open-access article under the CC BY license (<https://creativecommons.org/licenses/by/4.0/>).

Abstract— This study aims to explore the literacy of artificial intelligence that English teacher trainees should have and the application of artificial intelligence in English teacher education. Through the analysis of questionnaires and interviews, this study finds that English student teachers have different levels of artificial intelligence literacy. Many have some knowledge and can use relevant tools, but their knowledge and experience of AI are insufficient, and their views on its role in education also vary. Therefore, English student teachers need to improve their knowledge, skills and attitudes of artificial intelligence in order to adapt to the development needs of future education. Meanwhile, it has been found that the application of artificial intelligence in English teacher education can improve teaching efficiency, personalize learning experience, and provide teachers with more teaching resources and support. In the future, the integration of artificial intelligence into English teacher education should be further explored in order to cultivate high-quality English teachers with innovative spirit and practical ability.



Keywords— English student teachers; Artificial intelligence literacy; AI Application.

I. INTRODUCTION

Background of the study

In this tech-driven era, the applications of Artificial Intelligence in education are revolutionary. For instance, in English teaching, Artificial Intelligence offers intelligent voice evaluation for pronunciation correction and natural language processing for text analysis. As the main force of the future English education career, the level of artificial intelligence literacy of English teacher trainees will be directly related to the quality and development direction of future English education. English teacher trainees with good artificial intelligence literacy can better adapt to the development trend of education informatization, make full use of the advantages of artificial intelligence technology in teaching, innovate teaching methods, improve teaching effects, and provide students with a better English learning experience. However, little is known about the current

status of artificial intelligence literacy and application of English teacher trainees. Hence, there is an urgent need to study in depth whether they can meet the future needs of English education and what problems and challenges still exist.

Purpose of the study

The purpose of this study is to comprehensively understand English pre-service teachers' knowledge, skills, and practices related to artificial intelligence in the context of English education. This investigation also aims to identify how proficient these future teachers are in using artificial intelligence tools such as translation software, writing correction platforms, and intelligent teaching resources, which have become increasingly relevant in modern language classrooms. By examining their perceptions of artificial intelligence's role in education, whether as a supplementary tool, a core teaching aid, or a

technology with limited impact, this study aims to gauge their readiness to integrate artificial intelligence into real-world teaching scenarios.

Another key objective is to uncover the challenges they face, such as data privacy concerns, technical complexities, and cultural adaptation issues when using artificial intelligence in teaching. Understanding these obstacles is crucial for developing targeted solutions, such as improved training programs or more user-friendly tools, to enhance their confidence and competence. Additionally, the investigation explores how schools currently cultivate artificial intelligence literacy among pre-service teachers, including the effectiveness of existing courses and the types of training they want, such as practical case studies or hands-on tool usage workshops.

Moreover, this research aims to bridge the gap between artificial intelligence knowledge and practical classroom application, ensuring that English pre-service teachers are well-equipped to leverage artificial intelligence's potential to enhance student learning experiences, promote personalized instruction, and address the diverse needs of future students. By shedding light on their artificial intelligence literacy levels and needs, the investigation seeks to inform educational policies, teacher training curricula, and technological developments that align with the evolving demands of English language education in the digital age.

Significance of the study

Investigating the artificial intelligence literacy of English pre-service teachers holds profound significance in preparing future educators for the evolving landscape of language education. As artificial intelligence increasingly influences teaching and learning, understanding how these future teachers perceive, use, and integrate artificial intelligence tools is crucial for enhancing educational quality.

Such investigations help identify gaps in their knowledge and skills, ensuring teacher training programs can address deficiencies. For example, if many pre-service teachers lack expertise in using artificial intelligence for personalized language practice or data-driven feedback, curricula can be redesigned to include targeted training on these areas. This not only equips teachers with practical tools but also enables them to create more engaging and effective learning experiences, such as using speech recognition tools to improve students' pronunciation or adaptive software to tailor vocabulary exercises.

Exploring their attitudes toward artificial intelligence in education reveals how they balance technological aids with traditional teaching methods. Some may view artificial

intelligence as a core tool for automating tasks like essay grading, while others might see it as a supplementary resource for expanding learning materials. Understanding these perspectives helps in fostering a balanced approach, ensuring that artificial intelligence enhances rather than replaces human interaction, which is vital for nurturing students' emotional and cultural understanding in language learning.

Investigating the challenges they face, such as data privacy concerns or technical complexities, can inform the development of supportive policies and resources. If pre-service teachers highlight issues with unreliable translation tools or unequal access to technology, institutions can prioritize solutions like vetting high-quality software or advocating for equitable distribution of digital resources. This promotes inclusive education, ensuring all students, regardless of their background, can benefit from AI-enhanced teaching.

Insights into their expectations for school-based artificial intelligence training can guide the design of more relevant professional development programs. For instance, if most pre-service teachers express their need for practical case studies on integrating artificial intelligence into reading and writing classes, universities will offer hands-on workshops and real classroom simulations. This alignment between training and real-world needs boosts their confidence in using artificial intelligence effectively, preparing them to adapt to dynamic educational environments.

In essence, investigating artificial intelligence literacy among English pre-service teachers is a proactive step toward bridging the gap between technological innovation and pedagogical practice. It ensures that future teachers are not only proficient in using artificial intelligence tools but also capable of leveraging them to create inclusive, efficient, and student-centered English classrooms, thereby shaping the future of language education in an increasingly digital world.

As Pei Xiaojuan (2023) noted, trainees' Artificial Intelligence literacy is crucial for future educational change. Understanding and applying Artificial Intelligence helps meet students' needs and cultivate English teachers qualified for this intelligent age.

II. LITERATURE REVIEW

This section aims to review the current research on the use of artificial intelligence in English teaching and English teacher education. By reviewing the literature, we can show why our research on English pre-service teachers' artificial intelligence literacy is important. Also it can help us

establish a theoretical basis for our research.

2.1. Current status of research

In foreign countries, the significance of applying artificial intelligence technology in education is self-evident. Tondeur J et al. (2012) emphasized that integrating Artificial Intelligence into pre-service teacher training is crucial for future teaching quality. Artificial Intelligence has been applied in education relatively early and extensively, especially in ESL teaching, with remarkable progress in areas like vocabulary learning, listening training, and pronunciation correction. For example, intelligent tutoring systems propose automatic personalized suggestions and tasks according to learners' profiles (Kochmar et al., 2020). AI-driven learning platforms record students' behavior and interaction sequences for educators to further analyze their progress in their online learning (Tang et al., 2021), and recommend personalized learning resources for students (Whalley et al., 2021). Han (2019) attempted to utilize artificial intelligence technology to promote college students' self-directed English learning, introduced in detail the principles, characteristics and application areas of Artificial Intelligence, discussed in depth the requirements, structure, database and process of the self-directed English learning system, and chose the back-propagation neural network to design the module of the college students' self-directed English learning system. The results show that the system provides college students with intelligent and open self-evaluation tests and effective learning feedback.

The TPACK framework by Mishra and Koehler (2006) provides a foundation for understanding teachers' technological, pedagogical, and disciplinary knowledge integration. It is a model that emphasizes the integration of technological, pedagogical, and disciplinary knowledge for teachers. It helps teachers better utilize technology in teaching, understand how different knowledge components interact, and improve teaching effectiveness.

As Artificial Intelligence application widens, foreign studies also focus on Artificial Intelligence ethics and privacy protection in education, such as ensuring students' data privacy and fair access to AI-based help. Du Hua, Yuan Luxin, and Wang Luyao (2024) noted that international evaluations of teachers' intelligent literacy are different. The evaluation elements are diverse. Many foreign scholars have divided intelligence literacy into various aspects such as knowledge and application, and have focused on teachers' ability to utilize artificial intelligence. The evaluation subjects exhibit a diversified feature, with government departments and other official institutions playing key roles. Among the diversity of evaluation tools, from the perspective of evaluation orientation, they can be classified into outcome-oriented and process-oriented ones. Moreover,

the form of assessment questions also includes closed-ended and open-ended types. However, there's a lack of specialized research on English teacher trainees' Artificial Intelligence literacy evaluation. Currently, a perfect evaluation system and standards for this specific group haven't been established yet.

In China, Artificial Intelligence application in English education is drawing more attention. Enhancing the digital and intelligent technology-related proficiency of university teachers is an important support for building a high-quality higher education system and cultivating high-quality talents (Mei Bing, 2024). According to the industry standard of Digital Literacy for Teachers, the connotation and framework system of digital literacy for foreign language teachers in colleges and universities should be clarified, so as to provide theoretical basis and practical guidance for foreign language teachers to realize their professional development in the wave of digitalization, and to help the innovation and transformation of foreign language education.

The cultivation of the artificial intelligence literacy of teacher trainees is of vital importance for the formation of teachers' artificial intelligence application capabilities. Cao Rujun and Xu Chenchen (2023) stated that teacher trainees lack intelligent education knowledge, and English teacher trainees face the challenge of integrating Artificial Intelligence with English teaching, with insufficient practice in using Artificial Intelligence tools in teaching. Mei Bing (2024) examined the acceptance of 11 English teacher-training students of artificial intelligence applications to assist English speech training from the aspects of behavioral manifestations, perception, attitude and intention, etc. The results showed that the research participants showed a complex pattern of acceptance of AI-enabled foreign language teaching, agreeing on the one hand with its usefulness and ease of use, and on the other hand holding some reservations in their attitudes and intentions to use it.

2.2. Issues to be addressed

In the research on cultivating English teacher trainees' artificial intelligence literacy, several key issues stand out. Tomczyk (2024) discusses the challenges in educating future teachers in a rapidly evolving information society. Although the new generation of artificial intelligence technology possesses features such as deep learning, cross-fusion, human-machine collaboration, crowd intelligence openness, and autonomous control, problems like low explainability, system bias, and potential data security risks have brought unprecedented ethical risks and challenges to the industry and society (Wang Youmiao et al., 2023).

Additionally, the rise of Artificial Intelligence

technology is redefining teachers' roles, shifting them from traditional knowledge dispensers to learning facilitators. However, not all teachers can adapt easily. A British Council for Education survey shows that 24% of teachers haven't used any Artificial Intelligence tools, and 18% haven't used them in teaching tasks.

Moreover, while Artificial Intelligence can boost teaching efficiency, measuring its real-world benefits is tricky. Automated assessment systems may not align with human evaluation, and over-reliance on technology can sideline the social and communicative aspects of language learning. Thus, developing an assessment standard that balances technological advantages and traditional values is essential.

Wang Chaoran (2024) studied students' perceptions of AI-assisted writing. This can help assess the effectiveness of AI-based teaching for English teacher trainees. Meanwhile, we must address ethical and practical problems like plagiarism and tech dependence among trainees to guide and regulate their use of Artificial Intelligence in teaching.

Many studies often fixate on particular teaching aspects like English writing, leaving other teaching segments and cross-disciplinary applications scarcely explored. The evaluation system for trainees' Artificial Intelligence literacy is far from ideal. Moreover, the assessment of Artificial Intelligence application effects in teaching is insufficient, overemphasizing traditional academic performance while overlooking students' innovative and collaborative skills.

2.3. Trends in Research

Currently, research on English teacher trainees' artificial intelligence literacy has achieved certain results. Internationally, UNESCO's 2024 Framework for Teachers' Competence in Artificial Intelligence offers a global reference for teacher Artificial Intelligence competence standards.

In China, Shaan Jinfen and Zhu Hongyuan (2024) suggest teachers should handle data privacy and algorithm bias. Shao Mengqiu et al. (2021) focus on equal distribution of Artificial Intelligence educational resources. Luo Meina et al. (2024) explore frontier ways to enhance English teachers' Artificial Intelligence literacy. Since single-discipline theories are insufficient, future research will integrate education, psychology, computer science, and linguistics. For example, psychological theories can help study students' language learning development, and computer science theories can optimize Artificial Intelligence tool applications. Wang Runlan and Li Mengxue (2023) note that the assessment system for English teacher trainees' Artificial Intelligence literacy is

shifting from knowledge-based to comprehensive evaluation, using formative and summative methods. Pei Xiaojuan (2023) believes the connotation of trainees' Artificial Intelligence literacy will be more precisely defined when it is combined with teaching scenarios and subject characteristics.

III. RESEARCH METHODOLOGY

This study adopts a combination of quantitative and qualitative research methods, collects data through questionnaires and interviews, investigates the artificial intelligence literacy of English teacher trainees, analyzes the status quo of English teacher trainees in the application of artificial intelligence and the existing problems, and proposes an effective cultivation path. The research subjects of this study are English pre-service teachers in grades above sophomore at a university in Zhejiang Province. In this study, the questionnaire survey is used for quantitative analysis. The questionnaire data are analyzed through statistical software, and are combined with the interview results so that a comprehensive understanding of the current situation of English pre-service teachers' artificial intelligence competence can be obtained.

3.1 Research participants

Since the freshmen have no relevant English internship or apprenticeship experience, the research subjects are mainly English teacher interns from the second year and above of a certain university in Zhejiang Province. Students in the second year and above have a certain foundation of professional knowledge and are more likely to come into contact with courses related to artificial intelligence or participate in teaching practice activities. Therefore, they can more accurately reflect the artificial intelligence literacy and application situation of English teacher interns. The scope of the questionnaire covers the knowledge and understanding of artificial intelligence by English teacher interns, as well as their practical application ability, with a focus on their ability to apply artificial intelligence technology in middle school English teaching during the internship period, including teaching activities carried out in the daily practice training of professional skills. Structured interviews mainly explored their artificial intelligence literacy, teaching application, and their cognition of artificial intelligence in education.

3.2 Data collection

Data collection for this study consisted of questionnaires and interview surveys.

Questionnaire survey

To comprehensively explore English teacher trainees' Artificial Intelligence literacy and application, a questionnaire was designed, inspired by Xiao Yonghe et al. (2024). Zhong Bochang et al.'s (2024) division of Artificial Intelligence literacy into knowledge, emotion, and thinking dimensions was fundamental in constructing the questionnaire's content framework.

The questionnaire covered various aspects. It inquired about trainees' basic info, their Artificial Intelligence cognition in English education, like how they learned about Artificial Intelligence and its impact. It also examined their understanding of Artificial Intelligence, including knowledge of Artificial Intelligence technology and educational application principles. Regarding Artificial Intelligence tool use in English learning and teaching, it listed common tools such as intelligent translation and voice learning, asking about usage, frequency, and effectiveness. For those with internship experience, questions probed into AI-assisted junior high school English teaching during internships, including purposes, effects, student feedback, and challenges. Additionally, it included questions on comprehensive application and innovation, like future Artificial Intelligence application expectations in English teaching and school-related evaluations, to understand school education effectiveness in this area.

Most questions were multiple-choice for easy statistical analysis. Open-ended questions, like innovative Artificial Intelligence in English teaching ideas, were set as short answer to gather personalized views. Options followed the Likert Scale, such as five level responses for opinion-based questions and degree-related responses for extent questions. After the initial design, a pre-survey was conducted among sophomore and above English education majors. Their feedback on item clarity and information coverage led to adjustments in question formulation and

order.

The questionnaire was distributed both online via platforms like Wenjuanxing (posted on the school website, class groups, etc.) and offline in classrooms and school activities. At the start, the purpose, significance, and filling requirements were explained, and anonymity was emphasized. Invalid questionnaires (e.g., short completion times, random answers) were screened during recovery.

In total, 170 questionnaires were distributed, 150 were returned, and 126 were valid. The approximately 88.24% recovery rate and 74.12% effective recovery rate suggest the sample is representative, providing a reliable data basis for subsequent analysis. In the sample, sophomore students accounted for 26.19%, junior students for 45.24%, and senior students for 28.57%. The relatively high proportion of junior students might be attributed to the fact that students at this stage delve more deeply into professional courses and pay more attention to teaching practice and related technologies. The majority of students (69.84%) have had experience in secondary school English teaching internships or trainings, and 80.16% have participated in courses or training related to artificial intelligence.

Interview survey

To comprehensively understand English teacher trainees' Artificial Intelligence literacy and application, eight students from sophomore year and above were selected as interview subjects. Considering grade-related differences in knowledge and experience, students with and without internship experience were stratified from sophomore, junior, and senior grades for diversity and representativeness. As shown in Table 1, two students are sophomores without teaching internship experience, three students are juniors with 2-week teaching observation and three students are seniors with full teaching internship. To protect the privacy of the respondents, their names have been replaced with pseudonyms.

Table 1 Basic Information of the Interviewees

Name	Gender	Grade	Teaching Experience
Lisa	Female	Sophomore	No experience of junior high school English teaching internship or probation
Amy	Female	Sophomore	No experience of junior high school English teaching internship or probation
Emma	Female	Junior	Two-week experience of junior high school English teaching probation
Lois	Female	Junior	Junior high school English teaching probation experience
William	Male	Junior	Junior high school English teaching probation experience
Jessica	Female	Senior	Junior high school English teaching internship experience
Ava	Female	Senior	Junior high school English teaching internship experience
James	Male	Senior	Junior high school English teaching internship experience

The interview outline stated the purpose of exploring

trainees' Artificial Intelligence literacy and application, and

emphasized anonymity to ease interviewees' concerns.

Based on Zhong Bachang et al's (2024) Artificial Intelligence elaboration, questions probed students' first exposure to Artificial Intelligence and concept understanding, like "How did you first learn about Artificial Intelligence and your initial impression?" and "What's Artificial Intelligence's relation to English education?" Regarding Artificial Intelligence knowledge depth, questions included "Have you taken AI-related courses? Which is most helpful for English teaching?" and "How much do you know about core Artificial Intelligence technologies?"

Referencing Xiao Yonghe et al. (2024) on Artificial Intelligence tool application in education, students were asked about Artificial Intelligence tool use in English learning and teaching, such as tool types, usage frequency, and effectiveness.

For students with internship experience, in-depth questions covered Artificial Intelligence assisted junior high school English teaching, including purpose, teaching effect, student feedback, and problem-solving. Interviewees were encouraged to share innovative ideas about future Artificial Intelligence use in English teaching and their views on improving Artificial Intelligence literacy. Their self-perceptions of literacy enhancement and school expectations were also collected.

The interview used face-to-face or telephone methods according to the situation. As an interviewer, I maintained neutrality, listened actively, and asked follow-up questions. Interviews were recorded through audio and written notes. After the interview, the content was transcribed, organized, and checked for accuracy.

3.3 Data analysis

For the questionnaire data of the artificial intelligence literacy survey among English teacher trainees, descriptive statistics were mainly used. Percentages were calculated to analyze various aspects. For the basic information of the sample, the percentage of students in different grades (sophomores, juniors, seniors) was calculated, as well as the proportion of students with or without middle school English teaching internships and those who had participated in artificial intelligence-related courses or training.

Regarding the current state of artificial intelligence

literacy and application skills, percentages were used to show the distribution of students' knowledge levels about artificial intelligence, the frequency of using artificial intelligence English teaching tools, and their application in different teaching sessions. In terms of problems and measures, the percentage of students with different concerns about using artificial intelligence to assist teaching and their corresponding solution-seeking behaviors were counted. Also, percentages were used to analyze students' perceptions of schools' cultivation of artificial intelligence literacy and their expectations for relevant courses.

For the interview data, a content-based analysis approach was adopted. The interviews with English pre-service teachers were focused on aspects like artificial intelligence literacy, teaching applications, and perceptions of artificial intelligence in education. For each aspect, specific themes were identified. For example, in artificial intelligence literacy, themes included sources of artificial intelligence awareness; in tool usage patterns, themes were about the most commonly used tools. Then, the statements of the interviewees were grouped according to these themes, and key information such as differences among different grades in artificial intelligence-related knowledge and usage was extracted to comprehensively understand the interviewees' views and experiences.

IV. FINDINGS

The findings section was divided into questionnaire findings and interview findings.

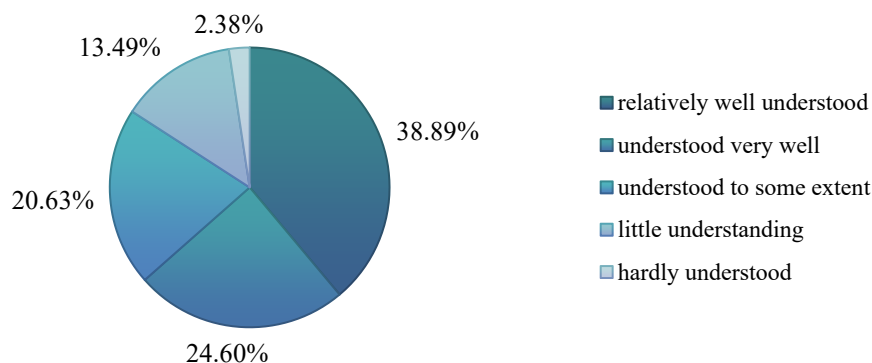
4.1 Questionnaire findings

Artificial intelligence literacy and application skills

In terms of knowledge and skill mastery, as shown in the following figure, 24.6% of the students know the definition and development history of artificial intelligence very well and can elaborate on it; 38.89% of the students know more about it and are aware of the important events; 20.63% of the students know some basic concepts and the general development; 13.49% of the students know very little about it and have only heard of the related terminology; and 2.38% of the students have almost no knowledge about it.

Figure 1

Understanding of AI Definition and Development

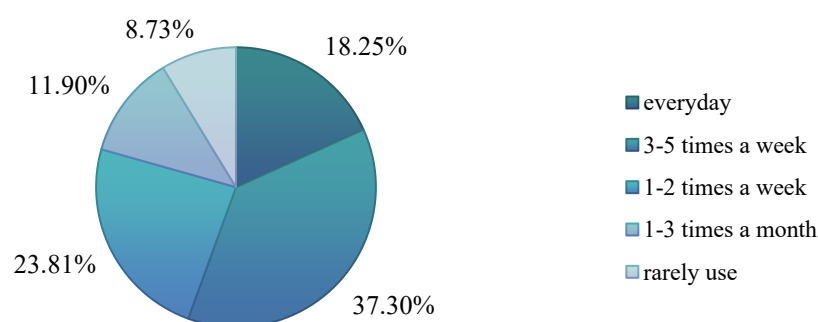


In terms of pedagogical application, as shown in Figure 2, the frequency of tool use shows that 18.25% of the students use the artificial intelligence English teaching tool every day, 37.3% use it 3-5 times a week, 23.81% use it 1-

2 times a week, 11.9% use it 1-3 times a month, and 8.73% use it rarely. In English writing teaching, 43.65% of students analyze tool feedback before guiding students. In reading teaching, 39.68% of students use intelligent translation tools.

Figure 2

The Frequency of Using AI-based Teaching Tools

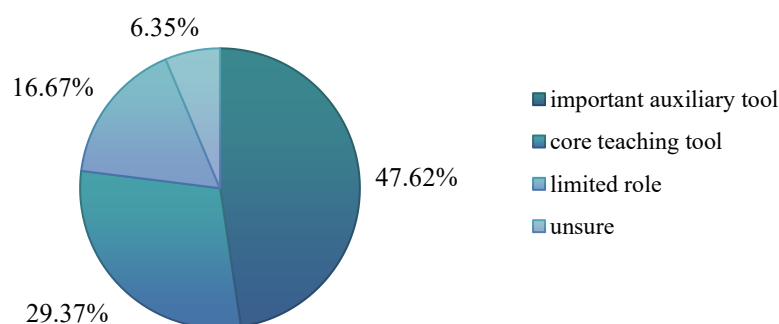


Among the perceptions of artificial intelligence in English education, in terms of role perception, as shown in Figure 3, 47.62% of the students considered artificial

intelligence as an important aid. Regarding teaching effects, 40.48% think artificial intelligence tools significantly improve junior high school English teaching.

Figure 3

Perception of AI's Role in Teaching

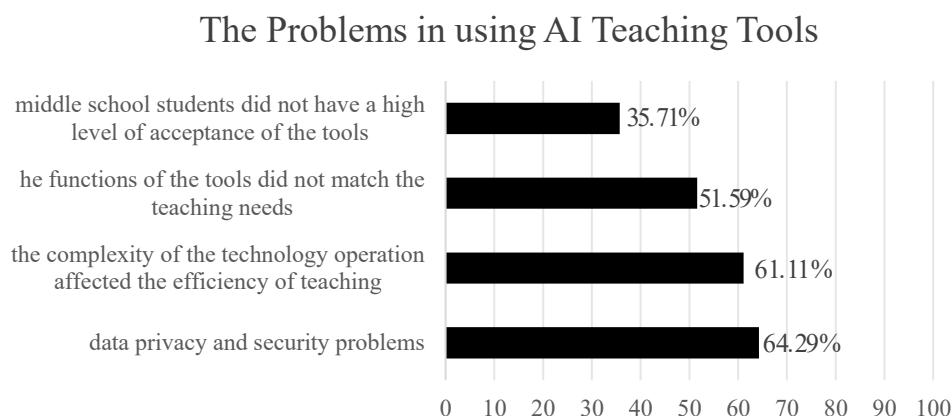


Problems and measures in using AI for teaching

In the process of using artificial intelligence to assist junior high school English teaching, as seen in the figure below, 64.29% of the students thought that there were data privacy and security problems, 61.11% thought that the

complexity of the technology operation affected the efficiency of teaching, 51.59% thought that the functions of the tools did not match the teaching needs, and 35.71% thought that the students did not have a high level of acceptance of the tools.

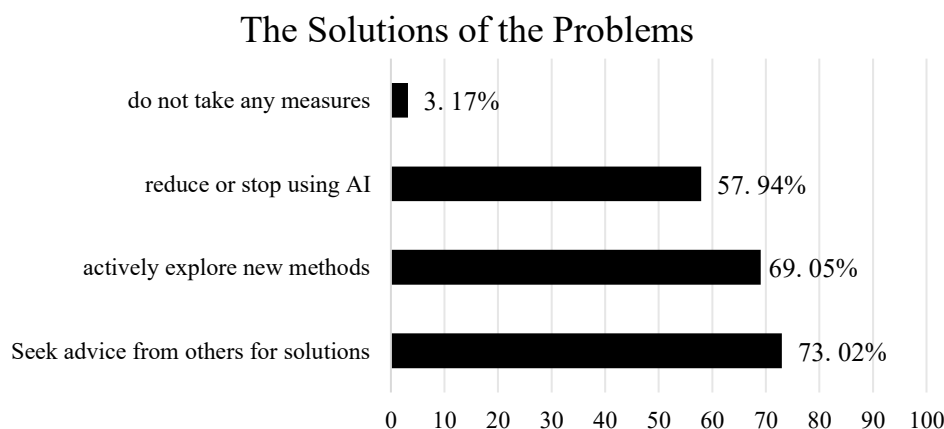
Figure 4



In the face of these problems, as shown in Figure 5, 73.02% of the students chose to seek advice from others for solutions, 69.05% actively explored new methods, 57.94%

chose to reduce or stop using, and only 3.17% did not take any measures.

Figure 5



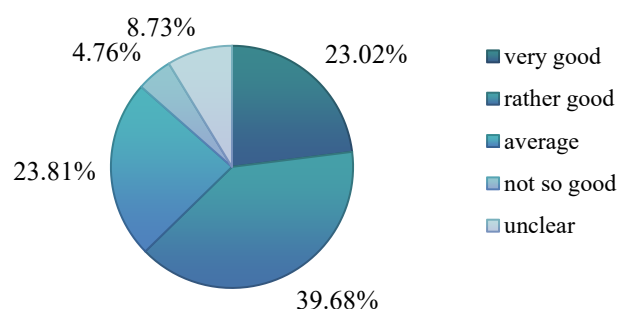
Perceptions of in-school artificial intelligence literacy programs

As for the aspect of schools' cultivation of artificial intelligence literacy for English teacher trainees, as shown in the following figure, 23.02% of the respondents thought that their schools had done a very good job in this aspect, with abundant courses and practice opportunities. 39.68%

of the interviewees thought that the school could meet the basic requirements for developing English teacher trainees' artificial intelligence literacy, 23.81% felt that the school's performance was mediocre and there was a lot of room for improvement, and 8.73% had no idea about the school's work in developing English teacher trainees' artificial intelligence literacy. And only 4.76% of the respondents felt that their schools did not pay enough attention to this aspect.

Figure 6

Perception of Artificial Intelligence courses in School



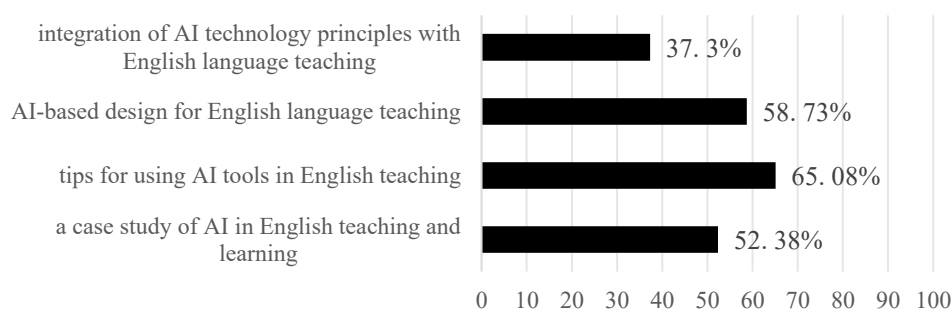
Overall speaking, the school has a certain foundation and achievements in cultivating the artificial intelligence literacy of English teacher trainees, but there are still areas that can be optimized and improved, especially efforts can be made to further improve the quality of cultivation and strengthen publicity and communication.

As for the aspect of schools' cultivation of artificial intelligence literacy among English teacher trainees, as shown in the figure below, more than half of the respondents expect to learn about the specific application of artificial intelligence in English teaching through practical cases, reflecting their need for practical experience and concrete

operational examples. 65.08% of the respondents are eager to master the skills of using artificial intelligence tools in English teaching in order to improve the efficiency and quality of teaching. 58.73% of the respondents are aware of the importance of artificial intelligence in the instructional design process and expect to learn how to use artificial intelligence to optimize English teaching programs. 37.3% of the teacher trainees are more concerned about the direct application to teaching practice compared to the technical principles, but it also shows that there are still some people who have a demand for knowledge about the integration of technical principles and teaching.

Figure 7

Students' Demand for Artificial Intelligence Courses



Thus, the respondents' demand for courses or training on the integration of artificial intelligence and English teaching is characterized by practical application and skill operation. When planning relevant courses, schools can focus on considering strengthening the content of skills of using artificial intelligence tools, application case studies, and AI-based instructional design, so as to better meet the learning needs of English teacher trainees in the integration of artificial intelligence and English language teaching, and to enhance their teaching ability and literacy. At the same time, a more comprehensive curriculum system can also be

provided by appropriately taking into account the group of students who are interested in the integration of the principles of artificial intelligence technology and teaching.

Interview findings

This study's interviews with eight English pre-service teachers from a Chinese university aimed to explore their Artificial Intelligence literacy, teaching applications, and perceptions of artificial intelligence in education. The participants, with different academic years and teaching experiences, provided diverse insights.

Artificial intelligence literacy and its root causes

The sophomores' exposure to artificial intelligence mainly came from sci-fi media and social media. Sci-fi movies often depict artificial intelligence in a futuristic and sometimes exaggerated way, like intelligent androids with superhuman capabilities. Social media, on the other hand, spreads trendy AI-related news and simplified explanations. This kind of exposure forms a rather idealized and fragmented understanding of artificial intelligence. For example, they might be fascinated by the idea of artificial intelligence but lack knowledge about its real world applications in education. As a result, their artificial intelligence literacy is more about general awareness than practical understanding, as they haven't been exposed to in-depth academic or professional content yet.

The seniors, however, learned about artificial intelligence through professional software and internship experiences. During internships, they used AI-powered teaching software that could analyze students' learning data. This hands-on experience in a teaching context made them understand how artificial intelligence can be effectively integrated into educational practices. Ava stated, "During my internship, I used AI-powered teaching software. It could analyze students' learning data and push out different levels and types of homework to achieve personalized teaching." Their literacy is more practical and profound, rooted in real-world applications, which is a significant difference compared to the sophomores.

They also differ in divergent usage patterns. Sophomores typically focus on basic functions of artificial intelligence tools, like using translation software mainly for word to word translations. Their limited academic knowledge and teaching skills mean they are not yet ready to explore more complex features. For instance, they may not know how to use advanced settings in translation tools to improve the quality of translations for different types of texts. This basic usage reflects their elementary level of artificial intelligence literacy in the context of teaching applications.

In contrast, seniors are more inclined to integrate multiple artificial intelligence tools. They might combine writing correction tools with data analytics. By doing so, they can not only correct students' writing errors but also analyze patterns in students' writing over time. This shows a more sophisticated understanding of how different artificial intelligence functions can work together to achieve better teaching outcomes, indicating a higher level of artificial intelligence literacy. But they still face issues like inaccuracies in cultural interpretations by translation tools, which shows that even with a relatively high level of literacy, there are areas that need improvement.

Challenges in AI-Integrated teaching

During their teaching applications, both juniors and seniors faced technical problems. Platform lag was a common issue. Emma said, "When using the AI-based voice teaching tool, there was a delay between students' pronunciation and the tool's feedback. It really disrupted the teaching rhythm."

Speech recognition errors also occurred frequently. Lois mentioned, "When using artificial intelligence to correct students' oral English, incorrect recognition happened frequently. It was very likely to misguide the students." These technical glitches not only affected the teaching experience but also made it difficult to fully utilize the potential of artificial intelligence in the classroom.

Over-reliance on artificial intelligence was a significant concern. Moreover, there were equity gaps in access to AI-based teaching resources. Students from different economic backgrounds or schools with varying technological capabilities had different levels of exposure to artificial intelligence tools. This inequality could widen the educational gap between students, undermining the goal of providing equal educational opportunities.

Measures to address challenges

English pre-service teachers should actively engage in learning AI-related knowledge and master the use of various artificial intelligence tools proficiently. This proficiency enables them to integrate artificial intelligence more effectively into English teaching. As Jessica mentioned, "We should constantly learn about artificial intelligence technology, enhance our digital literacy and apply the latest technologies to our teaching practice." They should consistently keep track of artificial intelligence advancements and participate in relevant training, ensuring they stay updated with the latest trends and applications of artificial intelligence in education.

Before employing artificial intelligence tools in teaching, thorough testing is essential. This step helps to promptly identify and resolve potential issues regarding technical stability. When selecting artificial intelligence tools, factors such as technical stability, educational equity, school infrastructure, and students' individual differences must be taken into account. James said, "In the face of challenges related to technical stability, it is necessary to choose reliable technology suppliers and regularly maintain and update the tools in use." Additionally, it is crucial to have multiple backup plans in case of technical failures, guaranteeing the seamless continuation of teaching even if artificial intelligence tools malfunction.

During the teaching process, closely monitor each student's utilization of artificial intelligence tools. Provide

extra support to students with limited technical resources to ensure every student benefits from AI-assisted English instruction. Strengthen communication with students to understand their experiences and feedback when using artificial intelligence tools, and adjust teaching strategies accordingly. Lisa mentioned that we should pay attention to the usage situation of each student in teaching and offer more assistance to those students with limited technical conditions.

Moreover, actively explore diverse integration models of artificial intelligence and English teaching. Keep a close eye on industry trends and apply the latest technologies to teaching practice. Continuously enhance information technology and artificial intelligence literacy, and learn relevant programming knowledge and data analysis methods to optimize the use of artificial intelligence in teaching.

In conclusion, the artificial intelligence literacy of these English pre-service teachers varies greatly depending on their academic years and teaching experiences. While seniors generally show a higher level of understanding and application, they still need improve for all students. By implementing the above-mentioned strategies, we can enhance their artificial intelligence literacy and better prepare them for the future of AI-integrated English teaching.

V. DISCUSSION

This study delved into the artificial intelligence literacy of English pre-service teachers, presenting results that both concur with and diverge from previous research.

Previous research has repeatedly emphasized the significant role of practical experience in enhancing educators' ability to incorporate technology into teaching (Yang Daoyu, et al. 2025). Our findings strongly support this view. In our study, seniors with teaching internships exhibited advanced skills in integrating artificial intelligence tools, such as combining writing correction with data analytics. Conversely, sophomores, who had less exposure to professional teaching and AI-related practical settings, mainly utilized basic functions like translation. This aligns precisely with the experiential learning theory, which posits that hands-on experience serves as a crucial catalyst for the adoption of technology in educational environments.

The relatively large proportion of junior students (45.24%) in our sample further underscores the vital role of intermediate-stage training in cultivating artificial intelligence literacy. Students prioritize practical artificial intelligence tool skills (65.08%) and case studies (52.38%)

over theoretical knowledge. Pre-service teachers are more interested in immediately applicable strategies that can be implemented in their future classrooms. This preference for practical learning has also been observed in other teacher-training programs related to educational technology adoption. They are in accordance with the research of Wang Chenglin et al. (2023), who discovered that students at the intermediate academic level show a heightened eagerness to embrace new educational technologies when provided with appropriate training opportunities.

Regarding the limitations of artificial intelligence tools, prior research has pointed out cultural and technical challenges in AI-assisted language learning (Wang Youmiao et al., 2023). Our study is in agreement, as 62.5% of the interviewees reported that current artificial intelligence tools struggle to handle cultural nuances. For example, translation software often misinterprets idiomatic expressions, and writing tools tend to over correct creative writing. This is particularly crucial in language education, where cultural context is fundamental to effective communication.

However, the issue of students' access to artificial intelligence resources in our study offers a novel perspective. Despite 80.16% of the students having received artificial intelligence training, 33% of the seniors reported problems with students' access, such as poor internet connectivity. While global studies on the digital divide (UNESCO, 2021) have highlighted disparities in technology access, our research specifically focuses on the implications for AI-integrated English teaching. This finding extends previous research by emphasizing the necessity for schools to address these barriers to ensure equitable access to AI-enhanced education.

The distribution of students' artificial intelligence knowledge levels presented shows that a significant number of students have a moderate to good understanding of artificial intelligence, yet a considerable portion still has limited knowledge. This can be attributed to the differences in their sources of exposure. As evident from the interview data, sophomores' exposure to artificial intelligence mainly through sci-fi media and social media leads to a more fragmented and idealized understanding, while seniors' experience with professional software and internships results in a more practical and in-depth comprehension.

In terms of pedagogical application, the frequency of artificial intelligence tool use and its application in different teaching sessions vary. The relatively high proportion of students using artificial intelligence tools 3-5 times a week indicates a certain level of acceptance. However, the differences in usage between writing and reading teaching can be explained by the nature of the tasks. Writing teaching

may require more in-depth analysis of student work, making the use of AI-based feedback more valuable, as demonstrated by 43.65% of teachers analyzing tool feedback before guiding students in writing.

The perception of artificial intelligence as an important aid (47.62%) in English education reflects a general recognition of its potential to enhance teaching. Nevertheless, the diverse views on its role, ranging from a core teaching tool to having a limited role, can be associated with students' varying levels of experience with artificial intelligence. Those with more hands-on experience, such as seniors, may be more inclined to view it as a core tool, while others may be more cautious due to the observed limitations.

Regarding teaching effects, the fact that 40.48% of students believe artificial intelligence tools significantly improve junior high school English teaching suggests that artificial intelligence has had an impact. However, the 15.08% who think there is no enhancement or even a negative impact can be linked to the challenges faced, such as technical glitches and over-reliance issues.

The problems identified, such as data privacy and security (64.29%), technology operation complexity (61.11%), and mismatched tool functions (51.59%), are consistent with the overall challenges in AI-integrated education. The high percentage of students choosing to seek advice (73.02%) and actively explore new methods (69.05%) indicates a proactive attitude towards solving these problems. However, the 57.94% who chose to reduce or stop using artificial intelligence shows the severity of the issues.

The mixed evaluations of schools' artificial intelligence literacy programs, with 23.02% considering the school's efforts very good and 23.81% rating it mediocre, can be related to the actual curriculum offerings and practical opportunities provided. The high demand for practical cases (52.38%) and tool using skills (65.08%) reflects the inadequacy of current programs in meeting students' practical needs.

The study has some limitations. The study's sample size (126 questionnaires, 8 interviews) limits generalizability. While seniors and juniors were well-represented (73.81%), sophomores accounted for only 26.19%, potentially skewing results toward mid to upperclass perspectives. Data were collected from one Chinese university, which may not reflect regional variations in Artificial Intelligence access, teaching resources, or student demographics. Artificial Intelligence tools' inability to handle cultural nuances such as idiomatic expressions was identified by 62.5% of interviewees, but no solutions were tested in this study.

So we need to include participants from multiple

universities and regions to enhance representativeness. For example, comparing institutions in cities with those in the rural areas could reveal equity-related challenges. And it is also of great significance to track pre-service teachers' Artificial Intelligence competency development over time to identify how training programs and teaching experiences shape their Artificial Intelligence integration skills.

VI. CONCLUSION

The findings validate constructivist theories (Vygotsky, 1978) by demonstrating that hands-on teaching experiences significantly enhance Artificial Intelligence competency. This challenges traditional teacher training models that focus solely on theoretical knowledge. Institutions must adopt competency-based curricula integrating Artificial Intelligence tool training with classroom simulations. For example, micro teaching sessions could involve real-time Artificial Intelligence feedback on lesson plans. The 33% equity gap underscores the need for hybrid teaching models and government-funded initiatives to bridge the digital divide. Such as work with educational institutions to establish guidelines for equitable Artificial Intelligence resource distribution providing offline alternatives for students with limited internet access. College teachers need to update their concepts of educating students. With the goal of "developing the whole person" for talent cultivation, through technological empowerment of the educational process, the educational scenarios and behaviors are restructured (Chen Enlun et al., 2021).

For curriculum design, develop AI-pedagogy integration modules covering practical tool skills, cultural adaptation strategies to collaborate with linguists and developers, including but not limited to large language models, data mining systems, intelligent decision support platforms, etc., this also helps the faculty of universities transform theoretical knowledge into practical operational capabilities (Deng Jun et al., 2024). Implementing technology loan programs for students with limited access, providing tablets pre-loaded with offline Artificial Intelligence tools and training teachers in dual-mode teaching (online+offline) to ensure continuity during technical failures. Case studies of Artificial Intelligence in grammar and vocabulary teaching and include virtual reality simulations to train pre-service teachers in AI-supported classroom management.

For policy support, advocate for national standards, like requiring schools to allocate 10% of their budget to Artificial Intelligence resource equity initiatives. Establish Artificial Intelligence literacy assessment systems to monitor pre-service teachers' competency development.

This study quantitatively and qualitatively analyzed the current situation and challenges of Artificial Intelligence literacy among English teacher candidates, and proposed targeted curriculum reforms, technological development and policy recommendations. The study emphasized the importance of practice-oriented training and cultural sensitivity, and called for addressing the issue of technological equity. Despite the limitations of the sample and methods, this research provided an important reference framework for the integration of Artificial Intelligence and English education, and pointed out the direction for future research.

REFERENCES

- [1] Kochmar E, Vu D D, Belfer R, et al. *Automated Personalized Feedback Improves Learning Gains In An Intelligent Tutoring System*[C]//Artificial Intelligence In Education: 21st International Conference, AIED 2020, Ifrane, Morocco, July 6–10, 2020, Proceedings, Part II 21. Springer International Publishing, 2020: 140-146.
- [2] Han B. *Application of Artificial Intelligence in Autonomous English Learning Among College Students*[J]. *International Journal of Emerging Technologies in Learning*, 2019, 14(6): 63-74.
- [3] Mishra P, Koehler M J. *Technological Pedagogical Content Knowledge: A Framework For Teacher Knowledge*[J]. *Teachers College Record*, 2006, 108(6): 1017-1054.
- [4] Tang K Y, Chang C Y, Hwang G J. *Trends In Artificial Intelligence-Supported e-Learning: A Systematic Review And Co-Citation Network Analysis (1998–2019)*[J]. *Interactive Learning Environments*, 2023, 31(4): 2134-2152.
- [5] Tomczyk Ł. *Digital Competence Among Pre-Service Teachers: A Global Perspective On Curriculum Change As Viewed By Experts From 33 Countries*[J]. *Evaluation and Program Planning*, 2024, 105: 102449.
- [6] Tondeur J, Van Braak J, Sang G, et al. *Preparing Pre-Service Teachers To Integrate Technology In Education: A Synthesis Of Qualitative Evidence*[J]. *Computers & Education*, 2012, 59(1): 134-144.
- [7] Whalley B, France D, Park J, et al. *Towards Flexible Personalized Learning And The Future Educational System In The Fourth Industrial Revolution In The Wake Of Covid-19*[J]. *Higher Education Pedagogies*, 2021, 6(1): 79-99.
- [8] Wang C. *Exploring Students' Generative AI-Assisted Writing Processes: Perceptions and Experiences from Native and Nonnative English Speakers*[J]. *Technology, Knowledge and Learning*, 2024: 1-22.
- [9] Chen Enlun, Jin Zhe. The generative logic and improvement pathways of university teachers' student-development competence [J]. *China Educational Technology*, 2021(9): 18–25.
- [10] Cao Rujun, Xu Chenchen. Artificial intelligence education literacy of pre-service teachers: Development level, current state of cultivation, and optimization strategies [J]. *Research in Applied Higher Education*, 2023(3): 45–52.
- [11] Du Hua, Yuan Luxin, Wang Luyao. International research on the assessment of teachers' artificial intelligence literacy: Subjects, components, instruments, and implications [J]. *The Chinese Journal of ICT in Education*, 2024(4): 79–88.
- [12] Deng Jun, He Fenfen, Wang Caiping. Developing a high-quality teaching workforce in the context of new quality productive forces: Imperatives, challenges, and feasible approaches [J]. *China University Teaching*, 2024(8): 4–9, 15.
- [13] Luo Meina, Yin Li, Zhao Chenggang. International research on teachers' artificial intelligence literacy: Current status, research hotspots, and emerging trends—A bibliometric analysis based on the Web of Science database [J]. *Educational Science Research*, 2024(9): 73–81.
- [14] Mei Bing. Enhancing the digital literacy of university teachers: Practical problems and system development [J]. *China Higher Education*, 2024(12): 50–54.
- [15] Mei Bing. Pre-service teachers' acceptance of artificial intelligence-enabled foreign language teaching [J]. *Contemporary Foreign Languages Studies*, 2024, 24(2): 89–99.
- [16] Pei Xiaojuan. A study of the current state and improvement pathways of pre-service teachers' artificial intelligence literacy in the context of New Teacher Education [D]. Guangzhou, Guangdong: Guangzhou University, 2023.
- [17] Shao Mengqiu, Qin Jian, Zhao Xiaosheng, et al. Cultivating English subject literacy: Educational application strategies based on artificial intelligence technologies [J]. *Chinese Medical Education Technology*, 2021, 35(4): 437–442.
- [18] Shan Jinfen, Zhu Hongyuan. Enhancing the artificial intelligence literacy of university foreign language teachers in the age of artificial intelligence [J]. *Journal of Heilongjiang University of Technology (Comprehensive Edition)*, 2024, 24(7): 6–10.
- [19] Wang Chenglin, Zhou Kai, Du Xiaomin, et al. A technology-enabled teaching-practicum community for pre-service teachers: Construction and practical application of an activity model [J]. *Modern Educational Technology*, 2023, 33(2): 99–109.
- [20] Wang Runlan, Li Mengxue. Artificial intelligence education literacy of pre-service teachers: Framework construction, status survey, and cultivation pathways [J]. *China Educational Technology*, 2023(3): 120–126.
- [21] Wang Youmei, Wang Dan, Liang Weiyi, et al. Agile governance: A new model for the ethical governance of artificial intelligence in education [J]. *e-Education Research*, 2023, 44(7): 21–28.
- [22] Xiao Yonghe, Zou Yumei, Feng Wenqin, et al. Evaluation and improvement pathways of university foreign language teachers' digital literacy competence [J]. *Modern Educational Technology*, 2024, 34(10): 83–91.
- [23] Yang Daoyu, Wang Canhui. The pedagogical significance of disciplinary practice and its realization [J]. *Journal of the Chinese Society of Education*, 2025(4): 51–56.
- [24] Zhong Baichang, Liu Xiaofan, Yang Minghuan. What is artificial intelligence literacy? Its essence, components, and assessment framework [J]. *Journal of East China Normal University (Educational Sciences)*, 2024, 42(1): 71–84.

- [25] Zhang Yingbin, Jiang Liying, Zhou Jingjing, et al. Pre-service teachers' perceptions and beliefs regarding the educational application of generative artificial intelligence: Current status, problems, and countermeasures [J]. The Chinese Journal of ICT in Education, 2024, 30(10): 32–4