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THE USER EXPERIENCE OF AI-BASED TEACHING AND LEARNING AND ITS IMPACT OF ENGLISH LEARNING OUTCOMES IN PRIMARY SCHOOLS IN CHINA[i]

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Abstract:
To improve English competence, this study examines the complex requirements and benefits of implementing artificial intelligence (AI) tools in Chinese primary schools. Semi-structured interviews, focus groups, and classroom observations offer multifaceted perspectives from educators and learners who have personally navigated the implementation of intelligent technology. The findings demonstrate divergent views among teachers, with optimism regarding the success of tailored instruction balanced against pessimism regarding the lack of nuanced cultural contextualisation in algorithmic materials. While students concur with these ideas, they also emphasise that teacher supervision creates a balance between directive feedback and creative or emotional development. Direct observations in the classroom show growing digital divides, technology limitations, and a reluctance to abandon tried-and-true instructional strategies. The possibility of upending paradigms necessitates reevaluating assumptions, such as the inevitability of data-driven, automated Education. The findings raise questions about whether conversational bots and intelligent tutors can enhance skill efficiency to the extent that they do so without compromising equity, holistic development, and the risks associated with passive student dependency. The empirical study encourages methodical execution, maximising personalised and interactive learning experiences offered by AI systems, while maintaining strong teacher-student relationships and avoiding fragmented development. It informs policies that prioritise thoughtful, culturally appropriate design without using rhetoric associated with "techno-solutionism". The findings present a novel integration philosophy that reconciles quantifiable productivity with high-quality learning experiences and self-actualisation.

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As intelligent technology becomes more ubiquitous, academics must continue to be cautiously optimistic while providing a clear description of implementation realities as they move from theory to practice. This study prompts us to consider what Education needs to become and should become in an era of increased immersion.

Keywords: AI integration, cultural contextualisation, teacher mediation, equity in Education, ethical considerations

摘要：
本研究通过半结构化访谈、焦点小组和课堂观察，探讨人工智能在中国小学英语教学中的应用现状。教师群体对 AI 个性化教学持谨慎乐观态度，但普遍担忧算法材料缺乏文化适应性；学生则认为教师监督能平衡 AI 的反馈与创造力培养。课堂观察揭示了数字鸿沟、技术局限性和传统教学惯性等问题。研究提出量化效率与人文关怀并重的整合路径，为 AI 教育产品的文化适配性和伦理设计提供政策建议。

关键词：人工智能教育，文化适配，教师中介，教育公平，小学英语

1. Introduction

Global Education is evolving in response to artificial intelligence (AI), interactive digital platforms, and data-driven, personalised learning. Ahmad *et al.* (2020) draw attention to the fact that further study is necessary before utilising AI for language acquisition, particularly in non-Western settings such as China. Because English is widely used worldwide, Chinese families and the government already view proficiency in the language as essential for gaining access to international opportunities (Zheng & Mei, 2021). Chinese officials also emphasise the importance of comprehensive English instruction that begins early and addresses linguistic, analytical, and cultural sensitivity (Liang, Li, & Chik, 2020). Thus, integrating AI into English instruction in elementary schools offers considerable potential but requires careful consideration of its benefits and viability.

A paradigm shift in how language learning is addressed and facilitated will be brought about through the use of Artificial Intelligence (AI) technology in language education. The creation of chatbots and virtual language teachers is a significant example of how AI is used in language instruction (Annamalai, 2023). These AI-powered user interfaces simulate real-world interactions by engaging learners in dialogue, responding to their inquiries, and assisting them in improving their language skills. These tools utilise Natural Language Processing (NLP) to recognise and respond to user input, creating a dynamic and engaging learning environment that enhances language comprehension and communication skills.

Platforms for individualised learning with AI are also gaining popularity. These platforms use machine learning techniques to examine the performance, preferences, and progress of learners. They create personalised learning paths based on this information, adapting the pace, type, and complexity of the content to each student (Kabudi *et al.*, 2021). By targeting each student's unique strengths and limitations, this tailored method promotes more effective and efficient language acquisition. AI also enhances the evaluation and feedback systems in language education. NLP is utilised by automated assessment programs to evaluate vocabulary proficiency, grammatical use, and pronunciation accuracy (Gadhvi & Parmar, 2023). This real-time feedback enables students to identify mistakes promptly and correct them, thereby facilitating the development of their language skills more independently.

AI-enhanced language learning applications offer engaging, gamified experiences. AI algorithms analyse how students utilise these applications to personalise the information and exercises, thereby keeping them engaged and motivated (Smartico, 2023). Rewards, contests, and progress monitoring are examples of gamification techniques that help create an engaging learning environment, promoting regular practice and skill development. The addition of AI to translation software and transcribing services enhances language instruction (Shadiev *et al.*, 2018). By translating texts and recording spoken information, students can experiment with cross-lingual learning and gain a deeper understanding of multiple languages and cultures.

According to Anis (2023), AI has considerable potential to enhance English teaching by customizingtailoring content to students' proficiency levels. According to Hobert & Meyer von Wolff (2019), the literature highlights how artificial intelligence conversational bots, intelligent tutoring systems, automatic writing evaluation programs, and other technologies can provide tailored language practice based on an individual's strengths and shortcomings. Research on certain AI systems shows promise for enhancing specific abilities, such as grammar and vocabulary. Nonetheless, there are still gaps in our knowledge of ethical issues, practical integration, and the complexities of multiple language learning. A cookie-cutter approach runs the risk of being insensitive to cultural dynamics and overly reliant on technology; therefore, it is essential to analyse implementation issues (Deuchar, 2022) critically. It is also necessary to carefully consider long-term proficiency improvements, ensuring equal access across all areas, and making the necessary pedagogical adjustments (Anis, 2023). Understanding teachers' and students' initial experiences with AI in the classroom can yield invaluable contextual information to inform suitable integration.

By conducting a thorough study of AI integration for English instruction in Chinese primary schools, this study aims to close knowledge gaps. Rich viewpoints emphasising both opportunities and risks will be gathered from professionals creating policy, teachers modifying their teaching, and students utilising AI technologies. The investigation aims to provide insights for the ethical and comprehensive integration of AI to achieve national targets for holistic English competence without compromising the human relationships that underpin language performance.

Although China is rapidly integrating AI technology into Education to promote personalised learning, several obstacles must be overcome before these technologies can be effectively utilised for English language learning (Liu & Ren, 2022). The development of well-rounded English proficiency, encompassing linguistic agility, analytical skills, and cultural understanding, is a top national objective that necessitates a comprehensive framework (Nozima & Nusratovich, 2023). Regarding the challenges of integrating AI in the actual world in Chinese elementary schools, there are still research gaps. While some research indicates that AI tools, such as writing assessors and conversational bots, can enhance specific abilities, the overall impact on comprehensive language mastery remains unclear (Huang & Li, 2023). There is now a dearth of critical analysis, despite the pressing need to address long-term proficiency increases, the impact of student engagement, fair regional access restrictions, and cultural sensitivity difficulties. Cross-context transferability also poses challenges because most AI research is conducted in Western environments, which differ significantly from Chinese contexts, as Chen, Gascó-Hernández, and Esteve (2023) point out.

Furthermore, although research indicates that redefining teacher roles and duties is necessary for AI integration, few studies dive in-depth into how teachers adapt their pedagogical techniques for AI-assisted classrooms (Özdemir-Çağatay, 2023). To formulate suitable policies and realise AI's potential, it is essential to understand the practical challenges, optimal methodologies, and changes in mindset. However, in China, there remains a dearth of research on teachers' opinions regarding the difficulties of using AI, its impact on student relationships, and how to strike a proper balance with traditional approaches. This study can help address the gaps in the literature on the use of AI programs by students, technology integration by teachers, and expert advice. It will offer much-needed proof of the complex ethical integration of English instruction at the elementary level in China. The goal of the investigation is to inform educational policies and methods that harness the benefits of artificial intelligence for tailored learning, without compromising the indispensable emotional, cognitive, and cultural underpinnings that stem from human connection.

2. Objectives

RO1: To identify Chinese primary school teachers' and students' attitudes and perceptions regarding the integration of AI-powered platforms and tools into English language instruction.
RO2: To explore Chinese primary school teachers' and students' firsthand experiences using intelligent tutoring systems, conversational bots and other AI-enabled technologies to teach or learn English.
RO3: To analyse key difficulties and barriers Chinese primary school teachers and students encounter when attempting to adopt AI technologies such as machine translation tools, automatic writing evaluation software and other platforms for English instruction.

RO4: To investigate the effect of adopting AI-based teaching methods and learning programs on measurable English proficiency development outcomes, including reading, writing, listening and speaking skills mastery.

3. Method

The study employs a qualitative approach, incorporating semi-structured interviews, classroom observations of primary school teachers, and students' testimonies. In keeping with the constructivist paradigm, inductive analysis of participant experiences using AI technology for English Education in Chinese primary schools is made possible using qualitative research methods (Ruslin *et al.*, 2022). Qualitative techniques, as stated by Gläser-Zikuda, Hagenauer, & Stephan (2020), utilise multidimensional data sources to gain deeper insights and understand the underlying meanings. This way is appropriate for examining intricate social phenomena that lack clear-cut causes. The investigation of the interplay between cultural elements, developmental concerns, and localised adoption challenges is crucial and calls for an exploratory perspective to unravel the 'how' and 'why' nuances influencing the successes and failures of AI integration. Testing with predetermined hypotheses is unable to fully capture the changing attitudes of students toward novel intelligent systems or the emerging issues that teachers encounter.

The researcher directly observed participants' interactions with AI systems, taking thorough field notes to record conversations and responses. The study included both participant and non-participant observations, each providing a different perspective on how AI technology is being utilised in language instruction.

The primary tool for richly narrating teacher, student, and expert perspectives on the dynamics of AI integration in Chinese primary school English instruction will be a 16-question semi-structured interview script (Adeoye-Olatunde & Olenik, 2021). The first set of background questions determines participant demographics, including years of experience in the classroom, technical proficiency, exposure to various AI technologies, such as chatbots, and key English learning priorities. Open-ended questions that followed encouraged in-depth conversations about integration attempts, subjective experience-based attitude changes, localised optimisation suggestions, and comparisons between human and artificial intelligence (AI) teaching in terms of social-emotional learning and cultural contextualisation (Ruslin *et al.*, 2022).

During two to three-hour non-participant ethnographic observation sessions, teachers use technologies such as intelligent tutors and automatic speech recognition to facilitate AI-assisted reading, writing, vocabulary, and conversational English practice. They also use a structured checklist to track usage patterns over time, technical and monitoring issues, troubleshooting behaviours, and integration friction points. The process involves verifying the types of platforms implemented, recording technical issues and their resolutions, calculating problems associated with monitoring, assessing student engagement cues based on participation levels, and providing qualitative descriptions of integration friction points. Adding much descriptive commentary allows people to

capture natural conversations, situations, and subtle exchanges that symbolise new difficulties. To avoid selective bias, broad inclusion criteria require monitoring implementation attempts that span from seamless adoption to disengaged user experiences across both urban and rural locales.

A theme analysis was employed to thoroughly examine the impact of AI technology on English Education in Chinese primary schools. There were several steps: familiarising oneself with the data, developing preliminary codes, identifying themes, assessing the themes, defining and labelling the themes, and preparing the final report. With this method, researchers can thoroughly immerse themselves in the data, identify recurring themes, and gain a comprehensive understanding of the participants' experiences and perspectives. Thematic analysis made it easier to identify various viewpoints on AI integration, exposing both its drawbacks and advantages (Davidavičienė, 2018). Using this systematic methodology, the researchers condensed complex qualitative data into meaningful themes, providing important new insights into the study's research topics. Thematic analysis enhanced the validity and depth of the research findings by ensuring that the study's conclusions were grounded in the voices of participants and by providing a systematic framework for data interpretation.

4. Findings

The findings of this study provide a nuanced understanding of the incorporation of AI-based teaching and learning in Chinese primary schools, particularly regarding its impact on the outcomes of English language acquisition. Diverse viewpoints from educators and students shed light on the complicated terrain of artificial intelligence adoption in educational settings. These opinions were gathered through semi-structured interviews, focus groups, and direct classroom observations.

A range of optimism and scepticism can be seen in the attitudes that teachers have about artificial intelligence (AI). While some educators are optimistic about the promise of personalised instruction made possible by AI technologies, others are concerned about the lack of cultural contextualisation in algorithmic materials. This divergence highlights the need to strike a balance between preserving cultural and pedagogical integrity and advancing technological innovation. In addition, the findings indicate a growing digital divide, limitations in technological capabilities, and a reluctance to abandon traditional instructional strategies. Despite the possibilities that artificial intelligence holds, many educators continue to rely on tried-and-true methods, which highlights the necessity of implementing techniques that are both thoughtful and gradual.

When it comes to artificial intelligence (AI) in Education, students' attitudes are similar to those of their teachers, with varied degrees of enthusiasm and caution. Despite students recognising the advantages of tailored learning experiences made available by AI systems, they also emphasise the importance of teacher supervision in fostering a balanced educational environment. It is widely acknowledged that teachers play a vital role in providing directional feedback and fostering students' creative and emotional

growth—the highlights of the complementary nature of human and technical interventions in the field of Education.

An understanding of the practical challenges associated with incorporating AI can be gained from observations made in primary school classrooms. When it comes to the general adoption of AI-based teaching and learning, substantial barriers, such as digital divides, technological limitations, and resistance to change, emerge as the most significant obstacles. Additionally, the findings underscore the importance of maintaining positive relationships between teachers and students and avoiding fragmented development in the face of technological advancements. As a result of the study, a careful approach to incorporating AI is recommended, with an emphasis on the necessity of systematic execution and cultural sensitivity.

The findings raise important considerations regarding the potential trade-offs associated with teaching through artificial intelligence. Although artificial intelligence technologies hold the promise of improving skill efficiency, concerns exist over the potential for students to become dependent on them and for their holistic development to be compromised. Furthermore, the study emphasises the importance of ensuring that all individuals have equal access to artificial intelligence technologies and the need to give serious consideration to the ethical concerns associated with their use in educational environments. As artificial intelligence technology becomes increasingly pervasive, educators face the challenge of navigating its intricacies while maintaining the core principles of effective teaching and instructional practices.

In conclusion, this study offers valuable insights into the user experience of AI-based teaching and learning in Chinese primary schools, as well as its impact on English language learning outcomes. The findings shed light on the opportunities and challenges associated with the use of artificial intelligence in educational settings, capturing a range of viewpoints from education professionals and students. It is vital to develop a balanced approach that leverages the benefits of artificial intelligence while preserving the integrity of Education and promoting fair access to technological advancements. That approach must be adopted moving forward.

5. Discussion

Within the context of English language education, this study's discussion delves into the myriad implications associated with the implementation of AI-based teaching and learning in Chinese primary schools. This discussion highlights the most significant themes and implications that emerge from the data, drawing on the diverse range of perspectives gathered through semi-structured interviews, focus groups, and classroom observations.

Firstly, the research emphasises the importance of possessing a sophisticated understanding of how artificial intelligence can be effectively integrated into educational settings. It is essential to recognise the diverse attitudes and perspectives held by educators and students, even though artificial intelligence technologies offer enormous

potential for enhancing language acquisition and providing more personalised educational experiences. The intricate interaction between technological innovation, pedagogical tradition, and cultural environment is reflected in the spectrum of optimism and scepticism that is experienced among educators. As a similar point of reference, the viewpoints of students emphasise the importance of ensuring that the educational process incorporates both human interaction and technological intervention in an appropriate balance.

As a result of the conversation, one of the most prominent themes that has emerged is the significance of cultural contextualization in education based on AI. The findings highlight the importance of giving careful thought to cultural nuances and educational techniques, as they demonstrate that educators are concerned about the lack of cultural sensitivity in materials generated by algorithmic systems. In a nation as diverse and multicultural as China, where the ability to communicate in English is becoming increasingly valued, it is of the utmost importance to ensure that artificial intelligence technologies align with the country's educational goals and cultural values, because of this, technology developers, educators, and legislators must engage in continuous conversation and collaborate to construct artificial intelligence tools that are culturally relevant and responsive to the diverse needs of students.

In addition, the discussion underscores the role that instructors play in AI-enabled classrooms as mediators and facilitators of learning relationships. Despite the potential of artificial intelligence technologies to provide students with tailored learning experiences, the findings underscore the crucial role that teachers play in guiding students, offering feedback, and providing emotional support. It is the responsibility of teachers to act as critical interpreters of content provided by artificial intelligence, helping pupils navigate complex language and cultural themes in a meaningful way. As a result, the successful incorporation of artificial intelligence (AI) into educational settings is contingent upon educators' ability to adapt their instructional strategies and view technology as a supplement to, rather than a replacement for, human instruction.

One further significant idea that emerges from the conversation is the importance of ensuring that everyone has equal access to artificial intelligence technologies. There are concerns about digital divides and unequal access to technology, particularly in rural and underserved areas. Artificial intelligence has the potential to transform education and bridge learning gaps, but it also poses risks associated with these advancements. In light of these findings, it is clear that proactive efforts are necessary to ensure that every student has an equal opportunity to benefit from learning experiences facilitated by artificial intelligence. To increase inclusive access to technology and eliminate inequities in educational outcomes, it may be necessary to make investments in infrastructure, teacher training, and community engagement programs.

In addition, the discussion sheds light on the ethical uncertainties associated with the incorporation of AI into educational settings. As artificial intelligence technologies become more advanced and widespread, concerns arise regarding privacy, data security, and algorithmic bias. The findings underscore the importance of transparency,

accountability, and ethical oversight in the development and implementation of artificial intelligence systems in educational settings. Educators, legislators, and technology developers need to collaborate to establish explicit norms and ethical frameworks that safeguard the rights and well-being of children while harnessing the potential of artificial intelligence for educational advancement.

In conclusion, this study's discussion offers valuable insights into the complex environment of artificial intelligence-based teaching and learning in primary schools in China. This conversation underscores the significance of cultural contextualisation, teacher mediation, equity, and ethics in the integration of artificial intelligence technology in Education, as it evaluates various perspectives and highlights key topics and implications. To ensure that AI-enabled Education promotes inclusive access, cultural sensitivity, and ethical practice while maximising the benefits of technological innovation for language learning and academic achievement, stakeholders need to collaborate and engage in thoughtful dialogue. That is the case moving forward.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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