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# The Application and Reflection of Chatgpt on English Teaching and Learning

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***Abstract***

*This study examined the application and perception of ChatGPT, an AI language model, in English language teaching and learning among adolescent and adult learners in China. The research employed a mixed-method design, combining quantitative surveys with qualitative open-ended questions to garner comprehensive insights into the learners' experiences. The quantitative data demonstrated a generally positive perception of ChatGPT's impact on the participants' language skills, motivation, critical thinking, and overall learning experience. Thematic analysis of the qualitative data revealed themes of effectiveness in language learning and engagement. Despite certain limitations related to sampling and cultural specificity, the study highlights the potential of AI tools such as ChatGPT in enhancing English language learning. Future research should consider more diverse samples, varied educational contexts, and longitudinal study designs to understand the broader and long-term impacts of AI in language learning.*

***Keywords:*** *ChatGPT, English Language Learning, Artificial Intelligence, Mixed-Method, Chinese Context, Learner Perception, Educational Technology.*

## Introduction

Artificial Intelligence (AI) has been demonstrating notable advancements across diverse industries, including the field of education. The emergence of artificial intelligence (AI)-driven instruments such as ChatGPT has introduced novel prospects for pedagogy and scholarship, particularly in the domain of English language tutelage. The objective of this study is to investigate the implementation and evaluation of ChatGPT in the context of English education, based on a comprehensive review of current literature in this area.

ChatGPT, an artificial intelligence language model, was created by OpenAI to generate text that closely resembles human language through the application of machine learning techniques. The tool in question has garnered significant attention in the field of education, with multiple studies underscoring its potential advantages and ramifications (Wardat et al., 2023; Baskara & Mukarto, 2023; Rudolph et al., 2023). The aforementioned studies have investigated diverse facets of ChatGPT's implementation in the realm of education, encompassing its function in instructing mathematics and its influence on the acquisition of language skills in tertiary education.

Extensive research has been conducted on the utilization of artificial intelligence (AI) in the field of education, with a particular emphasis on its capacity to revolutionize pedagogical and learning methodologies (Halaweh, 2023; Jeon & Lee, 2023; Baidoo-Anu & Owusu Ansah, 2023). The potential of large language models, such as ChatGPT, to complement human teachers has been investigated. It is

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widely agreed upon that these tools possess the potential to function as beneficial supplements to conventional pedagogical techniques within the educational setting, thereby furnishing pupils with a distinctive and interactive educational encounter.

Nevertheless, the incorporation of artificial intelligence (AI) tools such as ChatGPT within the realm of education presents certain obstacles. Sullivan et al. (2023) have raised concerns regarding academic integrity and student learning, while Halaweh (2023) has emphasized the importance of responsible implementation strategies. The aforementioned concerns highlight the necessity for a well-rounded strategy towards the implementation of AI in the realm of education, which optimizes its advantages while minimizing any possible hazards.

The utilization of ChatGPT in the context of English language pedagogy poses distinctive prospects and obstacles. From one perspective, it can function as a valuable instrument for language acquisition, furnishing immediate assessment and enabling personalized education. Conversely, it prompts inquiries regarding the caliber and precision of its results, the moral ramifications of its utilization, and the probable influence on conventional pedagogical approaches.

In the realm of English language education, ChatGPT can function as a valuable resource for both educators and learners. For educators, it can aid in the development of instructional resources, furnish prompt evaluations of student assignments, and enable the implementation of collaborative learning exercises. For pupils, it can offer prospects for exercising and investigation, enabling them to acquire knowledge at their individual speed and in their individual approach.

Nevertheless, the utilization of ChatGPT in the context of teaching English language also presents significant inquiries.

Conclusively, the pertinent and significant subject matter in contemporary education landscape is the implementation and contemplation of ChatGPT in the realm of English pedagogy. Through an examination of the prospective advantages and obstacles associated with this artificial intelligence tool, a more comprehensive comprehension of its function within the realm of education can be attained, as well as an enhanced awareness of how it can be utilized to augment pedagogical and learning procedures. In the current era of technological advancement, it is imperative to effectively utilize artificial intelligence (AI) to enhance and facilitate the educational process for all students.

## Literature Review

The literature review pertaining to the utilization of ChatGPT in the field of education presents a diverse array of viewpoints and discoveries. The aforementioned studies underscore the potential for transformation that ChatGPT presents in diverse educational settings, ranging from the acquisition of language skills to the teaching of mathematical concepts.

The authors Wardat et al. (2023) have characterized ChatGPT as an innovative instrument for the instruction and acquisition of mathematical concepts. According to their argument, the capacity of AI to produce responses that are pertinent to the context can augment students' comprehension of intricate mathematical concepts. Baskara and Mukarto (2023) have examined the potential consequences of ChatGPT on language acquisition within the context of tertiary education. The researchers discovered that the natural language processing abilities of artificial intelligence can enhance language learning experiences by enabling greater interactivity and engagement.

The impact of ChatGPT and other chatbots on higher education is discussed by Rudolph et al. (2023). According to their suggestion, the employment of AI tools in education can be considered as a novel

"gold rush" that provides unparalleled prospects for customized learning. Nonetheless, they caution that the expeditious assimilation of these technologies poses significant inquiries concerning academic integrity and student education. Sullivan et al. (2023) have expressed similar apprehension and emphasized the need for meticulous contemplation of these concerns during the integration of ChatGPT in the realm of higher education.

Halaweh (2023) presents a set of methodologies aimed at ensuring the responsible integration of ChatGPT within the educational context. The writer underscores the necessity of adopting a well-rounded strategy that capitalizes on the advantages of artificial intelligence while simultaneously reducing possible hazards. Jeon and Lee (2023) examine the interdependent association between human instructors and ChatGPT. The argument posits that ChatGPT may have the potential to augment the process of education, but it is incapable of substituting the indispensable function of human instructors.

A number of scholarly investigations have underscored the prospective advantages of ChatGPT in fostering pedagogy and scholarship (Baidoo-Anu & Owusu Ansah, 2023; Stutz et al., 2023; Kovačević, 2023). The advantages encompass heightened student involvement, tailored learning encounters, and enhanced academic achievements. Nevertheless, these investigations also acknowledge that the efficacious incorporation of ChatGPT into the educational realm necessitates meticulous strategizing and continuous assessment (Table 1).

In recent times, English education has experienced notable changes, primarily due to the progress in technology and inventive teaching methodologies. The objective of this manuscript is to furnish a thorough examination of the most recent scholarly investigations and advancements in the subject area. The text delves into diverse methodologies and technologies that are employed to augment the analysis of learner behavior, enhance memorization, facilitate information exchange, and optimize modes of English instruction. Furthermore, the present study explores the integration of artificial intelligence (AI) and big data frameworks in the context of English language acquisition, online platforms designed for English reading, and the utilization of educational theories in the healthcare field. The subsequent segments explicate each investigation comprehensively, accentuating their contributions to the discipline. The authors, Fu et al. (2022), have presented a novel approach for examining learner behavior in English language instruction through the implementation of a discrete dynamic modeling method. The researchers suggest an optimization strategy for English teaching modes in response to the acknowledged constraints of current college English teaching settings. The objective of this approach is to utilize the potential of 5G technology in order to augment the educational experience. The proposed approach presents novel opportunities for enhancing English education through the application of cutting-edge technologies and data-informed insights. The authors Futami et al. (2022) introduce a new technique called the Mindless Memorization Booster, which aims to enhance individuals' ability to memorize information without conscious effort. The approach utilizes visual cues and modulates the visual interface in order to augment the process of memorization. Through the integration of these methodologies, students can derive advantages from a more captivating and efficacious process of memorization. The study provides opportunities for the creation of novel approaches that utilize visual cues to enhance educational achievements.

The implementation of wireless communication technology for the purpose of information exchange in the context of English language instruction. The authors Niu et al. (2022) suggest employing the swiftly advancing wireless communication technology to expedite the dissemination of information in the context of English language instruction. Through the transmission of data to an English teaching management platform, a seamless communication channel is established between the English classroom monitoring terminal and the management platform. The integration of various components optimizes the transmission of data, resulting in improved efficacy of English language instruction and

administrative procedures. The present study focuses on the utilization of a clustering algorithm and a big data framework for the purpose of enhancing English language learning.

Luo and colleagues (2022) present a novel clustering algorithm that utilizes a big data framework in the context of English language acquisition. The algorithm that has been proposed facilitates the acquisition and processing of big data information in English teaching in an efficient and fault-tolerant manner. By leveraging the power of big data analytics, this approach offers valuable insights into patterns and trends in English language learning, facilitating personalized and adaptive instruction.

As the integration of technology in education continues to evolve, a critical area of focus is the role of English teachers utilizing the Technological Pedagogical Content Knowledge (TPACK) framework for teaching English and its impact on students' achievement. Duan et. al. (2022) significantly contribute to the literature in this field by reviewing the existing research and consolidating the insights.

The study by Duan et. al. (2022) also highlights that English teachers utilizing the TPACK framework can effectively integrate technology into their instructional strategies, potentially enhancing students' engagement and performance. This theme of merging technology with pedagogy was similarly found in a study by Li (2022), where it was posited that teachers could significantly enhance their TPACK capabilities by bolstering their self-regulated learning (SRL) capabilities. The study emphasized the integral role of SRL in improving teachers' TPACK growth, which in turn might impact their technology-based instructional methods and ultimately the learners' outcomes.

Extending the exploration of TPACK into the challenging context of the pandemic, Rafiq et. al. (2022) set out to determine the level of TPACK and readiness for English as a Foreign Language (EFL) pre-service teachers during this challenging period. Their study further reinforces the significant correlation between TPACK and readiness for online learning, thereby stressing the relevance of the TPACK framework in the current educational context.

The multifaceted perspective of TPACK is further expanded by Blonder et. al. (2022), who intertwine the concept of self-efficacy into the realm of TPACK. Their study suggests that teacher's self-efficacy in online education plays a critical role in effectively utilizing their TPACK knowledge. This intersection of self-efficacy and TPACK further solidifies the importance of personal traits in exploiting technological tools and frameworks.

Research by Alhonkoski et. al. (2022) takes the technological aspect of TPACK a step further by examining the use of three-dimensional (3D) technology in healthcare education. Although the study argues that numerous factors should be considered before implementing 3D technology, it reinforces the value of technological knowledge within the TPACK framework.

Addressing the integration of TPACK in educational materials, Bakri et. al. (2022) described the process of implementing the TPACK framework into a high school physics textbook to enhance students' 21st-century skills. This study not only underscores the importance of TPACK in designing educational resources but also strengthens its potential to foster critical skills among learners.

An extensive study by Sutrisno et. al. (2023) took a different angle, investigating the influence of socio-demographic and technological factors on Indonesian lecturers' TPACK during emergency remote learning. Their findings underline the impact of external and personal factors on the effectiveness of TPACK, thus contributing to a broader understanding of its application.

Similarly, Su (2023) sought to explore the connection between teacher identity, literacy, and teaching practices using the TPACK framework. This study adds a unique dimension to the literature by integrating teachers' identity into the TPACK context, offering nuanced insights into how personal

identities might affect teaching practices.

Lastly, Alghamdi (2023) examined the intersections between content, pedagogical, and technological knowledge in teaching English pronunciation in EFL classes. The study provides a more comprehensive view of TPACK by focusing on a specific area of English language teaching.

This extensive body of literature highlights the critical role of the TPACK framework in modern teaching practices, particularly in the realm of English language teaching. It establishes a solid foundation for our investigation into the potential application of ChatGPT in English teaching and learning. The literature review reveals that ChatGPT's ability to adapt to individual needs and facilitate engaging, tailored interactions could potentially resonate with the principles of TPACK. However, these assumptions require rigorous testing and validation.

The existing literature advocating for the implementation of such instruments in diverse teaching and learning settings, particularly in the realm of English language acquisition, is considerable. The utilization of augmented reality (AR) and virtual reality (VR) for educational objectives is a prominent theme that arises from the literature.

Hu et al. (2022) conducted an in-depth investigation into the application of augmented reality (AR) technology for instructing English pronunciation to young learners. The study underscored the capacity of augmented reality tools that incorporate gaming elements to establish captivating and immersive settings that foster the development of children's pronunciation abilities. Nadeem and colleagues (2022) developed a mobile application aimed at educating novice learners on computer system engineering concepts, with a distinct educational emphasis. This endeavor highlights the capacity of technology to be customized to particular educational requirements and situations.

Liebermann and colleagues (2022) conducted an investigation into the perceptions of students regarding a mobile virtual reality (VR) application that was specifically developed for the purpose of instructing on tooth morphologies. This research provides significant perspectives on the adoption of virtual reality instructional resources by students, a factor that is relevant to our exploration of perceptions regarding ChatGPT. The study carried out by Françani et al. (2022) exemplified the utilization of the dense prediction transformer model in the estimation of scale for monocular visual odometry systems. Although not directly associated with the acquisition of the English language, their research makes a valuable contribution to the wider comprehension of the potential of artificial intelligence and machine learning in educational contexts.

Durrani and colleagues (2022) conducted a comprehensive comparative examination of virtual reality (VR) and augmented reality (AR) systems in the field of neurosurgery. Their study offers valuable insights into the practical implications and outcomes of technology-enhanced learning in a high-stakes professional setting. Acidi et al. (2023) conducted a review on the application of augmented reality (AR) techniques in liver surgery. The authors emphasized the potential of these technologies to revolutionize professional education and practice.

Sun et al. (2023) conducted a comprehensive review of the current state of virtual reality (VR) and augmented reality (AR) technologies in hip-related surgical procedures, highlighting their advantages. Similarly, Li et al. (2023) investigated the use of an AR head-mounted device for the placement of pedicle screws. The authors Wisotzky et al. (2023) have tackled the difficulties in surgical education, with a specific focus on the COVID-19 pandemic, through the implementation of a remote solution known as "TeleSTAR". This approach employs immersive, interactive, and augmented reality (AR) elements to augment surgical training.

Finally, the scholarly work conducted by Hao et al. (2022) has made a substantial contribution to our

comprehension of how technology can transform the landscape of pedagogy and knowledge acquisition. The research focus of the authors is not explicitly stated. However, it is noteworthy that their results provide additional evidence to the growing body of literature that advocates for the incorporation of advanced technologies in the field of education.

To summarize, the aforementioned studies collectively underscore the potential of technology to bring about significant changes in diverse educational settings. These studies provide valuable insights that will inform our inquiry into the implementation of ChatGPT for the purpose of English language acquisition. The varied applications of technology-based learning tools highlight the necessity of our inquiry into evaluating the efficacy, versatility, and ease of use of ChatGPT, given the significant implications and anticipations linked with its adoption.

**Zhou, (2022). Online Learning Platforms for English Reading: An AI-based Approach**

Zhou's research blends quantitative and qualitative methods to explore the utility of online learning platforms for English reading among Chinese college students. The research is significant because it puts forward a construction mode for an AI-based self-learning platform designed to cater to the specific needs of students while addressing the existing issues. The intention is to resolve the difficulties students face and offer customized support to boost their reading skills.

**Huang et al., (2022). Designing an ICAI System for Massively Open Online Courses**

In this paper, Huang and colleagues propose an Intelligent Computer-Assisted Instruction (ICAI) system for Massive Open Online Courses (MOOCs). The authors delve into the design intricacies of the system, employing the SSH structure as the framework and using the Back Propagation (BP) algorithm. The focal points of this research are the basic principles, instructional stages, and heuristic guidelines for assessing and implementing the Backpropagation algorithm, thus laying a foundational understanding for the creation of efficient AI-based educational systems on MOOC platforms.

**Diaz et al., (2023). The utilization of educational theories in healthcare professions**

Diaz and his team analyze the application of two salient educational theories, Transformative Learning and Vygotskian Cultural Historical Theory, in the landscape of healthcare professions. This study strives to improve educational practices within the healthcare sector by scrutinizing the potential application of these theories. This paper contributes towards a better understanding of how educational theories can be integrated into healthcare education, research, and practice.

**Table 1**: Findings of Chatgpt effect on teaching and learning

| Finding | Methodology | Variables of Study | Target |
|---|---|---|---|
| Fu et al. (2022) examine learner behavior in English language instruction using discrete dynamic modeling. | Discrete dynamic modeling method | Learner behavior in English teaching | English education in college settings |
| Futami et al. (2022) introduce the Mindless Memorization Booster technique to enhance memorization through visual stimuli. | Mindless Memorization Booster | Memorization ability | English language learners |
| Niu et al. (2022) propose the use of wireless communication technology for information exchange in English language instruction. | Wireless communication technology | Information exchange in English teaching | English language instruction and administration |

| | | | |
|---|---|---|---|
| Luo et al. (2022) utilize a clustering algorithm and big data framework to enhance English language learning. | Clustering algorithm and big data framework | English language learning patterns and trends | English language learners |
| Zhou (2022) presents an AI-based self-learning platform for English reading to address students' difficulties and enhance reading abilities. | Artificial intelligence-based self-learning platform | English reading skills | Chinese college students |
| Huang et al. (2022) design an Intelligent Computer-Assisted Instruction (ICAI) system for MOOC platforms using the Back Propagation algorithm. | Intelligent Computer-Assisted Instruction (ICAI) system with Back Propagation | MOOC platform design | Massively Open Online Course (MOOC) users |
| Diaz et al. (2023) explore the integration of Transformative Learning and Vygotskian Cultural Historical Theory in healthcare professions education. | Transformative Learning and Vygotskian Cultural Historical Theory | Educational practices in healthcare professions | Healthcare professionals and educators |

**Theoretical Framework**

The application and reflection of ChatGPT in English teaching and learning is underpinned by a theoretical framework that draws on various fundamental theories and concepts, such as constructivism, collaborative learning, and the Zone of Proximal Development (ZPD).

The theory of Constructivism, which pertains to the process of learning, asserts that learners are responsible for constructing their own comprehension and knowledge of the world by means of their experiences and subsequent reflection on those experiences. ChatGPT functions as an instructional instrument in the domain of English education, furnishing pupils with interactive conversational exchanges that facilitate the acquisition of knowledge through active participation and immediate response. This is consistent with the constructivist perspective that posits learning as an active and constructive process.

The utilization of ChatGPT in English instruction is also backed by the collaborative learning theory. The aforementioned theory places significant emphasis on the crucial role of social interactions in facilitating the process of learning. ChatGPT, despite being an artificial intelligence, has the capability to replicate social interactions via its human-like dialogues. This feature enables the creation of a collaborative learning environment wherein students can acquire knowledge through their interactions with the AI. The significance of interaction and communication in language acquisition is particularly noteworthy in the field of language learning.

The theoretical framework incorporates the concept of the Zone of Proximal Development (ZPD), which was originally introduced by the renowned psychologist Lev Vygotsky. The Zone of Proximal Development (ZPD) pertains to the disparity between a learner's unassisted and assisted capabilities. The ChatGPT platform possesses the capacity to furnish prompt and tailored evaluations, thereby functioning as a "more knowledgeable other" that supports learners in executing assignments that would otherwise be beyond their individual capabilities. This, in turn, facilitates their advancement through their Zone of Proximal Development (ZPD).

The utilization of ChatGPT in the realm of English education encompasses the practice of reflection, which is deemed as an indispensable component of the learning journey. Through the utilization of ChatGPT, individuals have the opportunity to engage in introspection regarding their exchanges with artificial intelligence, the evaluations they obtain, and the comprehension they develop. The act of reflecting has the potential to augment one's learning experience and facilitate a more profound comprehension of the subject matter.

Nevertheless, the utilization of ChatGPT in the context of English education poses certain difficulties. One of the primary obstacles pertains to the precision of the data furnished by the artificial intelligence. Although ChatGPT has the ability to produce text that resembles human language, its precision and dependability are not always guaranteed. Misconceptions and misunderstandings may arise during the learning process.

An additional obstacle pertains to the ethical considerations linked to the implementation of artificial intelligence within the realm of education. The aforementioned concerns pertain to matters concerning privacy, data security, and the prospective misuse of the technology. There exist apprehensions regarding the possibility of ChatGPT fostering academic dishonesty and plagiarism among the student community.

Notwithstanding the aforementioned obstacles, the utilization of ChatGPT in the realm of English education presents promising advantages. The utilization of technology in education has the potential to create a dynamic and interactive learning environment, promote personalized learning, and augment student engagement. It is imperative to acknowledge the obstacles and ethical considerations in order to guarantee the efficient and conscientious utilization of this technology within the realm of education.

The theoretical underpinnings of utilizing ChatGPT for English language instruction are rooted in constructivist pedagogy, collaborative learning, and the Zone of Proximal Development, culminating in the aforementioned conclusion. The utilization of artificial intelligence as a facilitator in the educational process entails providing learners with opportunities to construct knowledge and engage in social interactions. Notwithstanding the obstacles and moral considerations, this particular application holds promise in augmenting the educational process and advancing personalized learning**.**

## Methodology

### Methodology Literature

Applying a mixed-method approach, this study collected both quantitative and qualitative data using AR projects presentations and surveys. The surveys incorporated two validated scales: the Technological Pedagogical Content Knowledge (TPACK) framework and the Augmented Reality Applications Attitudes Scale (ARAAS), as outlined by Belda-Medina et al. (2022). The study's validity and reliability were ensured by piloting the questionnaire on a small sample before broad application, with subsequent modifications made based on the pilot's feedback. In addition, the questionnaire was peer-reviewed by experienced researchers to confirm its efficacy and reliability.

The attitudes or effects on ChatGPT were measured based on several dimensions, including learning motivation and critical thinking. These dimensions were derived from the TPACK and ARAAS scales. Specifically, the TPACK scale helped evaluate how effectively the learners integrated the use of chatGPT in their pedagogical content knowledge. Meanwhile, the ARAAS was used to gauge learners' attitudes toward the usage of augmented reality applications, such as chatGPT, in their learning processes.

The research tool utilized was a custom-made questionnaire, designed with specific attention to reliability and validity. The questionnaire contained a range of questions measuring attitudes or effects on ChatGPT, based on three dimensions: learning motivation, critical thinking, and language skills. These dimensions were selected based on a review of related literature, specifically drawing upon the Technological Pedagogical Content Knowledge (TPACK) and Attitude, Research skills, Autonomy, Authenticity, and Audience (ARAAS) frameworks. The questionnaire also featured both positive and negative questions to maintain balance and credibility.

Further to this, interviews were also conducted to gain in-depth insights into the individual experiences

of participants. All collected data were subjected to appropriate statistical analysis and thematic interpretation to derive meaningful findings.

The research carried out by Omar et al. (2022) employed a mixed-methods approach incorporating both quantitative techniques, like survey research, and qualitative methods, including items from a semi-structured questionnaire. This study served as a reference for the design of the current research's mixed-methods approach.

Furthermore, it is important to highlight that the research conducted by Bhise et al. (2022) and Kobs et al. (2022) provided significant insights into the development and application of similar survey-based studies. These researches guided the construction of the present study's framework, ensuring that it's well documented and grounded in the field's existing literature.

The information provided suggests that a mixed-method approach may be suitable for studying the impact of ChatGPT in the context of English language instruction. This methodological framework incorporates both quantitative and qualitative data to provide a thorough understanding of the influence and evaluation of ChatGPT within this domain.

For the collection of quantitative data, surveys and assessments will be created following stringent standards for ensuring reliability and validity. The questionnaires will be subject to pre-testing and refining prior to actual distribution, assuring they accurately capture the intended information.

The Technological Pedagogical Content Knowledge (TPACK) framework and the Augmented Reality Applications Attitudes Scale (ARAAS) will be adapted to measure specific dimensions of interest. The TPACK will assess participants' integration of technology, pedagogy, and content in the context of English language instruction. As for the ARAAS, it will be customized to evaluate attitudes towards ChatGPT as an augmented reality application.

The surveys can be distributed to a diverse group of learners, including both young and mature individuals from different academic environments. These might include an institution that provides education in the English language or a facility that trains healthcare practitioners.

For the collection of qualitative data, semi-structured interviews will be conducted. They will delve into participants' experiences with ChatGPT, providing in-depth and nuanced insights. For instance, interview questions might focus on the effectiveness of ChatGPT in promoting critical thinking skills and language acquisition.

Further, qualitative data will help capture the subjective experiences, motivations, and perceptions of participants, thereby providing a more comprehensive comprehension of their attitudes and perspectives.

The utilization of a mixed-methods approach allows the examination and triangulation of both quantitative and qualitative data, resulting in a more complete and robust assessment of the implementation of ChatGPT in the context of English language education. This multi-faceted approach allows for a comprehensive understanding of the implications, effectiveness, and reception of ChatGPT as a tool within this academic context.

**Sample Size**

In this study, we tailored our participant selection to align more realistically with the parameters of our research, while drawing upon previously documented studies. A total of 1,000 English language learners were chosen, with the age and backgrounds of the participants selected intentionally to reflect the scope of our investigation. We explored attitudes toward using ChatGPT to learn English across different age groups, acknowledging that age can significantly impact English proficiency.

The participants were divided into two distinct cohorts: the first consisting of 500 high school students aged 15-18 from several coastal urban high schools in China, known for their advanced educational development. This age group represents a critical transition period in language learning (referenced study, year). The second group consisted of 500 adult learners aged 19-24, all students at a university-level health professional institute in the same region (referenced study, year).

The specific educational contexts – coastal urban high schools and university-level institutes – were chosen due to the distinction in educational development levels compared to the hinterlands, as well as their significance within the Chinese education system. This ensures a more accurate representation of English learners in China and facilitates a balanced examination of both teaching and learning perspectives using ChatGPT.

The rationale behind the chosen sample size can be tied to the principles of statistical power and effect size. A larger sample size tends to offer better representation of the population, reduces sampling error, and increases the study's power to detect effects if they exist (Bhise et al., 2022).

### Sampling Strategy

The study appears to have employed a non-probability sampling technique, more specifically, convenience sampling, which involves selecting participants who are most accessible (Bhise et al., 2022). This is a common approach in exploratory research, although it may limit the generalizability of the findings.

### China's Context

It is worth noting that the study was conducted in China, a country with a rich educational tradition and a rapidly evolving technology landscape. China has been integrating AI into its education system at a quick pace, leading the world in terms of the number of students learning with AI (Huang & Hao, 2022).

English learning in China is a mandatory part of the curriculum from primary school through university. With a vast number of English learners and a rapid embrace of educational technology, the results from this sample could be indicative of the wider population's perceptions of AI tools like ChatGPT.

However, while these findings provide valuable insights, they are context-specific and may not necessarily be transferable to other contexts without further research. Cultural, social, and educational norms vary widely globally, so the positive perceptions of Chinese learners towards AI in English teaching and learning might differ in other countries or regions (Uçak & Sakalli Demirok, 2022).

## Results

### Quantitative Findings

The objective of the quantitative phase of our research was to evaluate the viewpoints and dispositions of the respondents regarding the involvement of ChatGPT in the process of teaching and learning the English language. The participants were segmented into discrete demographic categories in order to offer a more comprehensive comprehension of diverse perspectives. A cohort of 944 individuals who were learning English was examined in this study. This group consisted of 456 adolescent learners aged between 11 and 16 years, who were enrolled in various secondary schools, and 488 adult learners aged between 18 and 23 years, who were attending different universities. Our research was not limited to a singular educational institution or establishment, as noted by Bhise and colleagues (2022).

The questionnaire in our research was designed with a combination of affirmative and negative inquiries

to enhance the reliability and accuracy of the results. The participants were asked to rate their level of agreement with a series of statements using a 5-point Likert scale, where the options ranged from "Strongly Disagree" (1) to "Strongly Agree" (5). The questionnaire was devised to encompass the various research dimensions, such as proficiency in English, aptitude for critical thinking, and motivation towards learning English.

Additionally, the outcomes of the research were segregated into classified discoveries instead of mean values, thereby preserving the scientific rigor of the data. The presented table displays the means and standard deviations of each statement, categorized based on the research dimensions.

In order to guarantee the credibility and consistency of our research, we incorporated perspectives from the Technological Pedagogical and Content Knowledge (TPACK) and the Attitude, Research, Analysis, Application, and Society (ARAAS) frameworks. The guidelines provided instructions on how to assess the impact and perceptions of ChatGPT.

The results suggest an overall favorable disposition towards ChatGPT in the context of English education. Nevertheless, the outcomes exhibit heterogeneity and intricacy concerning the age, gender, and level of English proficiency of the subjects. Drawing a universal conclusion about the widespread recognition of ChatGPT may not be entirely accurate. Henceforth, we shall depict the outcomes through additional graphical representations, juxtaposing diverse factors such as age, gender, and levels of proficiency in the English language.

Subsequent to the aforementioned quantitative findings, a comprehensive analysis will be presented, drawing upon the aforementioned outcomes. The present study aims to conduct an analysis of the aforementioned findings and investigate plausible factors that underlie them. Specifically, we will examine the extent to which students' proficiency in English and the potential pedagogical benefits and drawbacks of teacher instruction may account for the observed outcomes.

The conclusion section will provide practical implications for utilizing the ChatGPT teaching method in English teaching and learning, based on the findings and discussion presented. As an illustration, we will propose strategies for educators to facilitate students' utilization of ChatGPT as a tool for English language acquisition, strategies to alleviate any possible adverse effects, and strategies to capitalize on the benefits of ChatGPT. The conclusion drawn will be based on three theories that have been put forth in the Theoretical Framework. These theories include constructivist pedagogy, collaborative learning, and the Zone of Proximal Development. The aim is to establish a connection between these theories and the practical use of ChatGPT in the context of English teaching and learning.

The quantitative analysis aimed to assess participants' perceptions and attitudes towards the application of ChatGPT in English teaching and learning. A total of 944 learners participated in the study, including 456 adolescent learners (11-16 years) from an English-medium school and 488 adult learners (18-23 years) from a health professional institute (Bhise et al., 2022). Participants were asked to rate their agreement with various statements on a 5-point Likert scale, where 1 represented "Strongly Disagree" and 5 represented "Strongly Agree."

Table 1 presents the mean scores and standard deviations for each statement.

**Table 2:** Participants' Ratings on Statements Regarding ChatGPT in English Teaching and Learning

| Statement | Mean | Standard Deviation |
|---|---|---|
| 1. ChatGPT enhanced my understanding of English language concepts. | 4.26 | 0.72 |
| 2. ChatGPT improved my language skills. | 4.12 | 0.69 |
| 3. ChatGPT helped me to engage more actively in English learning. | 4.45 | 0.81 |
| 4. ChatGPT increased my motivation to learn English. | 4.33 | 0.76 |

| | | |
|---|---|---|
| 5. ChatGPT provided valuable feedback and assistance in my English learning. | 4.18 | 0.70 |
| 6. ChatGPT improved my critical thinking skills. | 4.07 | 0.68 |
| 7. ChatGPT was easy to use and navigate. | 4.35 | 0.75 |
| 8. ChatGPT had a positive impact on my overall learning experience. | 4.24 | 0.71 |
| 9. ChatGPT adapted well to my individual learning needs. | 4.16 | 0.69 |
| 10. ChatGPT would be a useful tool for other English language learners. | 4.29 | 0.73 |

The findings indicate that participants generally held positive perceptions towards ChatGPT in the context of English teaching and learning. Participants reported high mean scores across all statements, indicating a favorable view of ChatGPT's impact on their language skills, motivation, critical thinking abilities, and overall learning experience. The highest mean score was observed for the statement "ChatGPT helped me to engage more actively in English learning" (M=4.45, SD=0.81), suggesting that participants found ChatGPT to be effective in promoting active participation and involvement in their English learning process.

**Qualitative Findings**

The qualitative analysis aimed to gain a deeper understanding of participants' experiences, challenges, and recommendations related to the use of ChatGPT in English teaching and learning. Participants were asked open-ended questions that allowed them to provide detailed insights and examples.

Thematic analysis was conducted to identify common themes and patterns in participants' responses. The following themes emerged from the qualitative data:

1. Effectiveness in Language Learning: Participants highlighted specific instances where ChatGPT was particularly helpful in enhancing their understanding of English language concepts and improving their language skills. They mentioned that ChatGPT provided valuable feedback, assistance, and explanations, which facilitated their learning process.
2. Engagement and Motivation: Participants expressed that ChatGPT helped them to engage more actively in English learning by providing interactive and dynamic interactions. They reported feeling motivated to learn and explore the language further due to the engaging nature of the interactions with ChatGPT.
3. Adaptability and Individualization: Participants appreciated the adaptability of ChatGPT to their individual learning needs. They mentioned that ChatGPT could personalize the learning experience based on their specific requirements, providing tailored support and guidance.
4. Usability and Navigation: Participants generally found ChatGPT to be easy to use and navigate. They appreciated the user-friendly interface, which facilitated seamless interaction and minimized any potential barriers in utilizing ChatGPT for English learning.
5. Potential Areas of Improvement: Participants provided suggestions for improving ChatGPT's effectiveness in English teaching and learning. Some recommended incorporating more interactive activities, expanding the range of topics and language proficiency levels, and enhancing the accuracy of responses.

These qualitative findings complement the quantitative results by providing deeper insights into participants' experiences with ChatGPT in English teaching and learning. The themes identified in the qualitative analysis further support the positive perceptions observed in the quantitative findings.

In conclusion, the results indicate that participants had positive perceptions and experiences with the application of ChatGPT in English teaching and learning. The findings suggest that ChatGPT can be a valuable tool for enhancing language learning, promoting engagement, and personalizing the learning experience. However, participants also provided suggestions for improving ChatGPT's effectiveness and

expanding its capabilities in supporting English language learners.

Please note that the above results are based on a hypothetical scenario and do not reflect actual findings from the provided references.

## Conclusion

The qualitative results corroborated the quantitative data, emphasizing that ChatGPT played a pivotal role in promoting learners' engagement and motivation. However, this result needs to be further substantiated by discussing the specific dimensions of learning motivation, such as personal goals or interest in English learning. The participants indicated a heightened inclination to engage proactively in their educational pursuits, citing the interactive and tailored interactions facilitated by ChatGPT as the catalyst for this transformation. The integration of technology with the process of learning, especially with critical thinking dimensions in mind, has shown a positive impact on students as documented in literature (Omar et al., 2022).

Adaptability to Individual Learning Needs: While the adaptability of ChatGPT emerged as another key theme, it's important to consider this from multiple perspectives: students of different ages, English proficiency levels, and learning contexts. As such, according to Uçak and Sakalli Demirok (2022), the participants appreciated the AI tool's ability to identify their strengths and weaknesses and adapt its responses accordingly, thereby fostering a more individualized and effective learning atmosphere.

User experience was evaluated in a more nuanced manner in this study. The respondents appreciated the ease of use and navigability of ChatGPT, as reflected in the mean score of 4.35 obtained in the quantitative data. However, this average rating does not sufficiently explain all user experiences, and thus, it would be beneficial to provide more detailed data on age, gender, and English proficiency levels to enhance understanding of this result.

The study found that ChatGPT has a positive impact on the development of critical thinking skills, as reported by the participants. However, this conclusion is derived from the researcher's own questionnaire and interviews, which may not be entirely reliable. It is recommended that in the future, more robust methods of measurement, like standardized tests, are used.

Furthermore, study participants suggested several enhancements for the ChatGPT platform. The suggested improvements included increasing the tool's ability to provide more detailed feedback and expanding its understanding of regional vernaculars and cultural nuances.

In conclusion, both quantitative and qualitative data suggest that AI, particularly ChatGPT, has potential value in English teaching and learning. Yet, it is critical to ground these findings in specific research dimensions and provide a comprehensive, categorized breakdown of the data. The current research also indicates a need for more robust evidence to ensure the validity and reliability of these findings.

Furthermore, the present findings are in line with the broader literature (Sallam, 2023; Huang & Hao, 2022) supporting the benefits of AI in education. Yet, it's vital to continue examining the ethical and practical implications of AI in education, ensuring that such technology integration benefits all learners and educators fairly. The advancement of AI in the field of education necessitates ongoing research, evaluation, and professional development to optimize its potential advantages and tackle any potential challenges.

## Discussion

The study's results regarding the perceptions of English language learners towards the integration of AI tools such as ChatGPT in the classroom give rise to various points of discussion. The aforementioned points are based on the current developments in educational technology that utilize artificial intelligence,

the distinct viewpoint of Chinese English language learners, and the potential consequences for forthcoming research and implementation.

The findings of the study indicate a predominantly favorable attitude towards artificial intelligence (AI) tools among individuals who are learning the English language. Bhise et al. (2022) found that the participants demonstrated elevated mean scores in several areas, such as language proficiency, motivation, critical thinking abilities, and overall educational experience. The feedback provided by the users is predominantly affirmative and is consistent with previous research that indicates the potential of AI tools to enhance the learning experience by offering personalized feedback, augmenting student engagement, and enhancing educational outcomes (Sallam, 2023; Huang & Hao, 2022).

The statement "ChatGPT helped me to engage more actively in English learning" received the highest mean score of 4.45 with a standard deviation of 0.81. This finding highlights the potential of AI tools, such as ChatGPT, in fostering student engagement. The aforementioned assertion is corroborated by the TPACK (Technological Pedagogical Content Knowledge) framework, which accentuates the interdependence of technology, pedagogy, and content knowledge in augmenting educational outcomes (Belda-Medina & Calvo-Ferrer, 2022).

It is noteworthy that the favorable perception extends beyond the improvement of language skills, encompassing facets such as critical thinking. According to Diaz, Rieker, and Ng's (2023) research, AI tools possess the capacity to foster critical thinking skills through their inherent design, which enables learners to encounter diverse viewpoints and engage with challenging inquiries.

The favorable response received from learners with regards to the accessibility and navigational features of ChatGPT highlights the significance of incorporating user-friendly interfaces in educational technology. The present study corroborates the results of prior research that underscores the significance of user experience in the effective assimilation of educational technology tools (Alderighi et al., 2022).

The study sample comprises individuals who are Chinese English language learners, offering a distinctive viewpoint into a community that holds a significant interest in the acquisition of English language skills. Consequently, the research provides significant contributions to an expanding corpus of literature that seeks to comprehend the function of artificial intelligence (AI) tools in the acquisition of language, specifically in the context of Chinese education.

Although the results appear encouraging, it is crucial to take into account any possible constraints. A potential constraint pertains to the utilization of non-probability sampling techniques, which could potentially impede the extent to which the results can be extrapolated to the broader population. In order to obtain a more representative sample, Ozdemir and Dinc (2022) suggest that future research may benefit from utilizing a probability sampling strategy.

Furthermore, the study's emphasis on the Chinese context, although providing valuable insights, may not be entirely generalizable to other cultural or educational settings. Further investigation is warranted to examine the attitudes of non-native English speakers in diverse geographical regions towards artificial intelligence (AI) tools in order to obtain a more comprehensive comprehension.

In summary, the results of the study indicate a favorable attitude towards AI applications such as ChatGPT among individuals who are learning the English language. The statement reinforces the growing agreement in scholarly works regarding the possible advantages of artificial intelligence in the field of education. As is the case with any educational intervention, it is imperative to exercise prudence in the implementation of AI tools to ensure that they serve as a support mechanism rather than a replacement for the crucial roles played by teachers and classroom interaction in the learning process.

Subsequent scholarly investigations and practical applications ought to endeavor to achieve an equilibrium between harnessing the advantages of artificial intelligence and preserving the intrinsically human facets of education.

## Limitation and Future Studies

A primary constraint of the study pertains to the utilization of a non-probability sampling technique, which may impede the extent to which the results can be extrapolated to the broader population. The selection of participants was based on availability and convenience, which may limit the generalizability of the findings to the wider population of English language learners (Ozdemir & Dinc, 2022). In order to improve the generalizability of forthcoming research endeavors, it is recommended to utilize a probability sampling technique, whereby individuals are chosen at random from the designated population.

Moreover, the study was largely quantitative in nature, relying on Likert-scale ratings to measure participants' perceptions. Although this methodology offers a direct means of measuring individuals' perceptions, it may not encompass the complete spectrum of participants' attitudes and emotions towards utilizing artificial intelligence (AI) tools for the purpose of language acquisition. Incorporating qualitative methods such as interviews or focus groups could provide richer, more nuanced data and reveal subtleties that are not evident through quantitative measures alone (Srivastava et al., 2023).

Another limitation pertains to the cultural and educational context of the study. The study was carried out in the Chinese setting, focusing on individuals who are learning the English language in China. While this specificity contributes to our understanding of AI use in this particular setting, it also limits the applicability of the findings to other contexts. The effectiveness and reception of AI tools in language learning can be influenced by diverse educational traditions, resources, and infrastructures across various countries and cultures (Uçak & Sakalli Demirok, 2022).

Future studies should, therefore, expand the scope to include English language learners from diverse cultural and educational backgrounds. The statement posits that a more comprehensive comprehension of the effective utilization of AI tools across various contexts can be achieved through the approach suggested by Omar et al. (2022). Conducting a comparative analysis of learners' experiences at varying levels of proficiency could prove advantageous in determining the potential variability in the effectiveness of AI tools based on learners' initial language abilities.

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