The contribution of artificial intelligence (AI) to Chinese EFL learners' classroom engagement and active learning

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ABSTRACT: Recently, various studies have highlighted the positive impacts of using artificial intelligence (AI) technologies in second language (L2) education. However, the contribution of such innovative technologies to English as a foreign language (EFL) students' psycho-affective states and learning approaches has remained under-explored. To fill this gap, the present qualitative study interviewed 30 Chinese EFL students to showcase the ways through which AI tools could contribute to their classroom engagement and active learning (AL) practices. The results of thematic analysis revealed that AI technologies contributed to the participants' engagement by fostering continuous learning, providing content tailored to learners' needs and levels, offering interactive exercises and tasks, giving immediate feedback on assignments and energizing traditional lessons by adding joy and fun. On the other hand, the findings demonstrated that AI technologies could facilitate the students AL by providing personalized and adaptive learning paths and practices, providing instant feedback, facilitating peer interaction, being available and flexible for learners, encouraging self-paced learning, and providing rich and engaging materials and activities. The findings are discussed in detail, and implications for L2 educators and policy-makers are provided to encourage the implementation of AI tools in L2 education as opportunities to enhance students' positive emotions and learning practices.
Keywords: Artificial intelligence (AI), EFL students, learner emotions, classroom engagement, active learning

La contribución de la inteligencia artificial a la participación en el aula y el aprendizaje activo de los estudiantes chinos de inglés

RESUMEN: Recientemente, varios estudios han destacado los efectos positivos del uso de la tecnología de inteligencia artificial (ia) en la educación de segunda lengua (l2). Sin embargo, la contribución de estas tecnologías innovadoras al Estado psicoemocional y los métodos de aprendizaje del inglés como estudiante de lengua extranjera (efl) aún no se ha explorado completamente. Para llenar este vacío, este estudio cualitativo entrevistó a 30 estudiantes chinos de inglés y mostró cómo las herramientas de inteligencia artificial pueden promover su participación en el aula y la práctica del aprendizaje activo (al). Los resultados del análisis temático muestran que la tecnología de inteligencia artificial mejora la participación de los participantes al promover el aprendizaje continuo, proporcionar contenidos a medida de las necesidades y niveles de los alumnos, proporcionar ejercicios y tareas interactivas, dar retroalimentación inmediata a los deberes y motivar los cursos tradicionales aumentando la alegría y la diversión. Por otro lado, los resultados del estudio muestran que las tecnologías

de inteligencia artificial pueden promover el aprendizaje de los estudiantes proporcionando caminos y prácticas de aprendizaje personalizadas y adaptadas, proporcionando retroalimentación instantánea, promoviendo la interacción entre pares", proporcionando disponibilidad y flexibilidad a los estudiantes, fomentando el aprendizaje de progreso autodefinido y proporcionando materiales y actividades ricas y atractivas. Estos hallazgos se discuten en detalle y proporcionan inspiración para educadores y responsables políticos de segunda lengua para alentar la implementación de herramientas de inteligencia artificial en la educación de segunda lengua como una oportunidad para mejorar el Estado de ánimo positivo de los estudiantes y la práctica de aprendizaje.
Palabras clave: inteligencia artificial (ia), estudiantes de efl, Estado de ánimo del alumno, participación en el aula, aprendizaje activo

1. Introduction

The role of technology in the context of second/foreign language (L2) has been widely acknowledged by different scholars (Teo et al., 2022; Wang et al., 2024; Wei, 2022). With the shifting trends in education, cutting-edge technologies have started being adopted by teachers and learners to foster their classroom perceptions and practices. Similarly, the rapid growth of artificial intelligence (AI) technologies and robots has entered L2 education, carrying several positive and negative consequences for the stakeholders (Derakhshan & Ghiasvand, 2024; Pokrivcakova, 2019). AI tools are transforming education given their revolutionary potentials in different areas (Guo et al., 2022; Liu & Wang, 2024). They can affect teaching, learning, and testing domains provided that L2 educators are ready and well-trained to adopt them (Ghiasvand et al., 2024). Research indicates that AI tools can facilitate L2 learners' learning with personalized and immediate feedback in the form of responses to prompts (Huang et al., 2023; Klimova et al., 2023; Yang & Zhao, 2024). They can have both advantages and disadvantages depending on their implementation (Guo et al., 2022). Along with learners' practices, AI technologies can affect and direct emotions, cognitions, and psychological states (Fathi et al., 2024; Huang et al., 2023). Various learner-related emotions are involved in the use of AI tools in L2 classes, especially in EFL contexts (Derakhshan, 2025; Yang & Zhao, 2024).

A psycho-emotional variable that may fluctuate in light of AI-mediated L2 instruction is learner engagement, which refers to students' active participation and involvement in classroom and home assignments and activities (Christenson et al., 2012). It is a positive state in which students invest their time and energy, pay close attention, and try hard to achieve classroom tasks assigned by their teacher (Finn & Zimmer, 2012). Previous studies on L2 learners' engagement, which are mostly correlational, suggest various personal and interpersonal constructs that interact with engagement (Wang & Kruk, 2024). It is also argued that learner engagement affects other positive emotions of teachers and learners (Al-Obaydi et al., 2023; Hiver et al., 2024). These studies are mostly in the context of face-to-face instruction rather than technology-mediated L2 teaching. However, some recent studies report the impact of AI technologies on L2 learners' degree of classroom engagement (Huang et al., 2023; Wang & Xue, 2024; Yang & Zhao, 2024). They considered AI tools as a chance to widen the research scope of learner engagement. Nevertheless, further research is still required to enrich this line of research.

Another less-attended area that AI technologies may affect is learners' active learning (AL), which is defined as an approach to learning in which students work and participate independently and actively in the classroom (Daouk et al., 2016). AL transforms learners' roles from passive agents to active individuals, who shape their own learning journey (Freeman et al., 2014). In light of AL, learners are accountable for their education and go beyond memorization to deeply examine and synthesize tasks (Adler, 1999). They are highly engaged in classroom activities both physically and cognitively (Skinner, 2010). AL can be achieved using different techniques, practices, and resources (Mulatu & Bezabih, 2018). Therefore, the use of AI technologies may affect this construct, as well. However, most of the studies on AL in EFL contexts are limited to its contribution to the acquisition of different language skills like speaking and communication, reading comprehension (Phan, 2022), and listening and writing (Mohammed & Al-hassan, 2023). Technologically, it has been maintained that AL can be developed using digital portfolios and mobile devices (Cabrera-Solano et al., 2020; Dayag & Abdalla, 2023). While some studies have approved the impact of AL on learners' psycho-affective factors like motivation and attitude, the interaction of AI technologies, AL, and classroom engagement has been ignored to date. To address the gaps, this study examined Chinese EFL students' perceptions about such interplay using a qualitative design, which is the innovative aspect of the study besides its AI-mediated essence. The findings would extend EFL educators' knowledge and understanding of AI-mediated L2 instruction, especially its impact on learners' emotionality and classroom behaviors.

2. Literature Review

2.1. Artificial intelligence (AI) and L2 education

AI technologies with the capacity to replicate human thinking skills and behaviors have recently captured the attention of educational researchers and practitioners (Guo et al., 2022; Huang et al., 2024; Pokrivcakova, 2019; Wang et al., 2024; Wu et al., 2024). In L2 education domains, it has been stated that AI tools inform and foster many aspects of teaching and learning (Huang & Zou, 2024). AI tools provide personalized and engaging learning experiences making education innovative, authentic, and autonomous (Huang et al., 2023; Klimova et al., 2023). There are several AI-powered bots and chatbots used in L2 education, including ChatGPT, TalkAI, Genni, Bard, etc. They have the potential to open up new opportunities for L2 learners to learn English interactively with high levels of motivation (Huang et al., 2023; Wang Xue, 2024). Research indicates that AI could facilitate L2 students' language skills (Fathi et al., 2024; Guo et al., 2022) and shape their psycho-emotional states including enjoyment, motivation, excitement, interest, happiness, engagement, pride, and socio-cognitive skills (Dörnyei, 2020; Li & Xing, 2021; Wang et al., 2022; Yang & Zhao, 2024). Similarly, AI technologies could contribute to L2 classroom practices (Farrokhnia et al., 2023), assessment (Derakhshan & Ghiasvand, 2024), and materials development (Rudolph et al., 2023). Emotionally, AI tools are able to increase the possibility of experiencing positive emotionality in L2 educators (Ismail & Alharkan, 2024; Yang & Zhao, 2024).

Depending on the acceptance and ease of use in adopting such innovative technologies in L2 education, students may go through various affective experiences. This is buttressed

by the Technology Acceptance Model (TAM), which argues that a user may accept or reject technologies according to their perceptions of usefulness, intention, and ease of use (Davis, 1989). In other words, the more they consider AI useful and manageable, the more they may experience positive emotions and implement it eagerly. Another possible theory behind this study is Pekrun's (2006) control value theory (CVT), which claims that learners' achievement emotions are the outcomes of their evaluation and appraisals of the value, controllability, and significance of an activity. Hence, the adoption of AI technologies may lead to positive emotional experiences in case EFL learners find them valuable, affordable, and beneficial for their learning. While the emotional side of AI-mediated L2 education is emerging in recent studies (Yang & Zhao, 2024), the majority of investigations are about the pros and cons of AI tools in different aspects of L2 teaching and learning (Xin & Derakhshan, 2025; Farrokhnia et al., 2023; Pokrivcakova, 2019). As for emotions, Yang and Zhao (2024) examined the emotional experiences and regulatory strategies of 498 EFL learners in China. They provided a range of positive and negative emotions induced by AI tools, along with preventive and responsive strategies to regulate them. Similarly, in the context of Iran, Ghafouri (2024) argued that AI could enhance 30 Iranian EFL students' classroom rapport and grit. Furthermore, Wong et al. (2022) found AI technologies influential in causing positive emotions such as well-being, grit, and rapport in L2 education. Taking a balanced perspective of AI-adoption, however, Shen and Guo (2024) contended that AI bots are neither too good nor too bad for EFL students' learning process and emotions. Although these studies have initiated to call attention toward AI-induced emotions, there are many other psycho-affective domains and learning practices that are possibly influenced by AI technologies in EFL contexts. Two such significant learner-related factors are engagement and AL, as described below. Previous studies have focused on a wide range of psycho-affective factors rather than taking a focused approach toward exploring particular AI-induced emotions and practices. Such a focused approach is one of the novelties of the present study.

2.2. Classroom engagement

The construct of student engagement is a pivotal factor in academic learning and success as it directs classroom activities and interactions between teachers and learners (Kirkpatrick et al., 2024; Pan et al., 2023; Shakki, 2022). Basically, the concept of engagement concerns students' sense of love, care, commitment, and curiosity during their learning process (Hiver et al., 2021). It has to do with their invested time and energy to learn a subject (Kuh, 2003). According to Skinner and Pitzer (2012), students' classroom engagement is the extent to which they are involved in the classroom practices and enthusiastically feel committed to their own learning. Engagement can also be described as the quantity and quality of learners' involvement in language learning tasks and activities (Hiver et al., 2021). Classroom engagement shows the efficacy of education and its real impact on learners (Shakki, 2023). In terms of structure, engagement is comprised of four dimensions; emotional, cognitive, behavioral, and agentic engagement (Zhou et al., 2021). Emotional engagement means experiencing positive emotions like motivation, joy, enthusiasm, and commitment to learning in the class; cognitive engagement is learners' use of mental strategies to regulate their learning; behavioral engagement pertains to learners' attempts, awareness, participation, and

perseverance in learning; and lastly agentic engagement concerns the proactive impact of education on learners, as active agents of their learning. Engagement is a complex learner-related factor that interacts with different psycho-affective factors in L2 education (Hu & Wang, 2023).

Research demonstrates that student engagement is affected by internal factors (e.g., personal efforts and states) as well as external factors (e.g., institutional support) (Harper & Quaye, 2009). Jang et al. (2010) found learner engagement effective in producing motivation and positive emotions and at the same time reducing negative emotions and disruptive behaviors among learners. Empirical studies show that different personal, contextual, psychological, and emotional factors determine the degree of learner engagement in L2 contexts (Hiver et al., 2021; Zhang et al., 2020). For example, in China, Wang (2022) examined 490 Chinese students and found their engagement positively correlated with their learning motivation and enjoyment. Additionally, Pan et al. (2023) conducted a quantitative study on 1968 Chinese EFL learners and reported that their engagement was highly associated with their psychological well-being and affective scaffolding. In a similar manner, Hu and Wang (2023) focused on the predictive power of Chinese EFL learners' engagement and found it significantly predicated by immediacy behaviors. In relation to AI technologies, the construct of learner engagement has also been studied by some scholars. For instance, Wang and Xue (2024) carried an interventional study on 113 Chinese EFL students, who used AI chatbots in the classroom. They concluded that the AI chatbots positively influenced and enhanced all the dimensions of engagement in learners. Moreover, Zhou and Hou (2024) maintained that AI empowers L2 education by promoting emotional, cognitive, and behavioral engagement of EFL learners and teachers. Focusing on Duolingo, Ouyang et al. (2024) argued that such an AI-powered technology could improve EFL learners' communicative skills and engagement. Another possible positive outcome of AI for EFL learners might be their AL, which is explained below.

2.3. Active learning

AL is a useful approach to education that highlights not only what learners are learning, but also how they learn (Cavenagh, 2011; Mohammed & Al-hassan, 2023). In AL, students are active constructors of knowledge and understanding rather than passive receivers of information from their teachers (Shen & Xu, 2015). It is an influential approach in which the students speak, reflect, interact, collaborate, write, present, solve problems, and transfer new information to contexts beyond the classroom (Mohammed & Al-hassan, 2023). AL approaches make students powerful and independent agents of their own learning (Daouk et al., 2016). It is the act of making students engaged in the learning process through participation (Ryan & Martens, 1989). AL is theoretically supported by constructivist perspectives (sociocultural theory), which contend that students build knowledge through social interaction and connecting new notions and experiences to finding knowledge (Bransford et al., 1999; Vygotsky, 1978). Additionally, socially situated cognition theory (SSCT) undergirds this approach by arguing that instruction is most successful in case it is situated inside a learner's own knowledge and worldview (Smith & Semin, 2004). As put by Skinner (2010), AL has three key features, including active involvement in learning, learning by experience, and

cognitive engagement. AL brings about different positive outcomes for learners and learning. It can enhance critical thinking and creativity (Demirci, 2017), knowledge construction and transmission (Shen & Xu, 2015), and learner motivation (Cavenagh, 2011). Other studies show that AL improves learners' classroom participation, lesson assimilation, test performance, and enjoyment of the learning process (Yahyazade et al., 2014; D'Silva, 2010; Freeman et al., 2014; Theobald et al., 2020).

Similarly, it has been reported that AL positively leads to emotional health, well-being, interest, creativity, motivation, academic achievement, and appreciation for learning (Cavenagh, 2011; Kuh et al., 2017; Owens et al., 2017). Different language skills have been found to be fostered by AL in the literature (Mohammed & Al-hassan, 2023; Phan, 2022). AL has also been examined in light of technologies. For example, Cabrera-Solano et al. (2020) carried out a study on 82 students in Ecuador and found that the use of mobile devices was effective in fostering AL in learners. Moreover, in Oman, Dayag and Abdalla (2023) implemented a mixed-methods study on 293 EFL students and concluded that digital portfolios could promote their AL. Despite these studies, there is a shortage of research on the interface of AI technologies and AI in EFL contexts. The gap is significant because the world of education is moving swiftly toward AI-mediated instruction. Additionally, previous studies on AL are mostly about its contributions to other learner-related factors or language skills rather than its mechanism in AI-powered contexts. To address these gaps, this qualitative study explored Chinese EFL students' perceptions about the role of AI tools in their engagement and AL, as two essential signs of effective L2 education. The following research question was followed in this study:

RQ: What are the perceptions of Chinese EFL students about the contribution of AI tools to their classroom engagement and active learning?

3. Method

3.1. Participants and context

The study recruited 35 Chinese EFL learners (college students) from four universities such as of Shanxi, Henan, and Shandong provinces. The study used convenience sampling for the data collection to include available participants. The participants were selected non-randomly based on willingness and availability. Their familiarity with AI technologies was another selection criterion for the participants. Five (14%) students failed to offer appropriate responses and incompletely answered the interview items. Therefore, they were excluded, leaving the final sample consisting of 30 participants. Among them, 20 (66%) have bachelor's degree and 10 (33%) have a master's degree. As for their gender distribution, 17 (56%) were males and 13 were females (43%). The age of the students ranged from 22 to 32. They participated in this study voluntarily, as approved in a written consent form.

3.2. Instrument

3.2.1. Semi-structured interview

A semi-structured interview was used to collect the data in this study because such interviews provide rich information about one's perceptions and experiences of a phenomenon in a free order of questions and answers. The interview was audio-recorded. Three open-ended questions were asked of each participant during the interview. However, they were free to explain their views as much as possible. Each interview lasted 15 minutes on average. The language of the interview was English. The questions focused on the students' perceptions and experiences of AI use and its contribution to their engagement and AL in L2 classes (Appendix). The interviews were held online, and the time was set with all the participants in advance. Explanations were given in case a question was not clear enough for the respondents.

3.3. Data collection

The data of this study were collected via a series of interviews with a sample of Chinese EFL students over a period of 28 days. The interview questions were designed based on the goal of the study and the literature review of related studies on AI in the educational arena. Their content validity was approved by three associate professors in China. Then the instrument was tested on a small scale of five participants, as a pilot phase. Revisions were made and the questions were finalized carefully. The participants came from four universities. The key concepts contained in the interview items were already explained to the students in a pre-study note. This was done to ensure the students involved had a clear understanding of the constructs of the study. The interviews were carried out interactively and approximately lasted 15 minutes. Warm-ups and probing questions were posed by the researchers. The students were encouraged to explain their perspectives and experiences using examples and personal stories of using AI. After collecting the interview data, the researchers transcribed the audio files and made them ready for a qualitative analysis, which is explained in the following part.

3.4. Data analysis

After collecting all the interview responses, the researchers transcribed them word by word and sorted them a Microsoft Word file. Then, thematic analysis was used to analyze the dataset. To do so, Braun and Clarke's (2006) framework was carefully followed in six steps. The first step is data familiarization in which the researchers read the interview responses a couple of times to get a comprehensive understanding of the students' perceptions. Second, 27 initial codes were created by highlighting important segments of each interview response. Afterward, the codes were pooled together to produce broad themes larger than the codes. For example, 'AI provides tailored content' and 'AI is need and level based' were combined to make up the second theme regarding engagement: "AI provides content tailored to learners' needs and levels". The next step was reviewing the generated themes again and

refining them. Subsequently, labels and phrases were given to the themes. In the end, a detailed report was produced for the findings with sample interview responses for each theme.

To guarantee the rigor of the findings, the researchers asked another researcher to do an audit trial of the entire data analysis in order to establish confirmability. Moreover, to observe credibility, member-checking and peer debriefing were done by the researchers by inviting the participants and two colleagues to assess and validate the findings and remove bias. Transferability was confirmed by the thick description of the context and research process. Finally, to secure the reliability of the findings, a second coder was asked to analyze the extracted themes. Then, inter-coder reliability was calculated by Cohen's Kappa coefficient. The results indicated a high intercoder agreement or dependability (r = .78). Regarding researcher positionality, the researchers took an outsider perspective in the interviews and remained neutral data collectors.

4. Findings

4.1. The contribution of AI to classroom engagement

The second interview question was transcribed and analyzed to unveil Chinese EFL students' perceptions about the role of AI tools in their engagement in the class. The results revealed that AI technologies had been perceived to affect Chinese EFL students' classroom engagement in five ways (Figure 1). The first common theme was related to the potential of AI tools in "fostering continuous learning". According to S22, "*AI tools make it possible to be constantly engaged in the learning process by using various bots in phones. This fosters continuous learning even outside the classroom*". Another student said, "*AI technologies involve students in a continuous learning culture by allowing them to independently work on the subject before and after the class*" (S11). The ability of AI in "providing content tailored to learners' needs and levels" was the second theme regarding this part of the study. As noted by a student, "*one of the main features of AI tools is that the content that they provide is tailored to their needs and levels and this makes the class engaging for learners*" (S13). Moreover, S3 argued that "*AI tools are really intelligent in that the content that they provide to students in response to their prompts is based on their needs and proficiency level. When students see such alignments, they become deeply immersed in the class*".

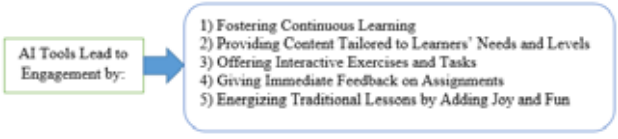

Figure 1. *EFL Students' Perceptions about the Contribution of AI Tools to their Engagement*

The capacity to provide interactive tasks was another reason for perceiving AI tools as influential in learner engagement. This aspect formed the third theme of the study, labelled AI fosters engagement by "offering interactive exercises and tasks". As evidence, a respondent contended that "*in speaking classes, AI tools are really engaging because they*

provide interactive tasks for students to discuss debatable topics" (S28). Another student stated, "*AI bots foster engagement by involving learners in interactive activities like role plays, simulations, idea sharing tasks, and debates using relevant prompts*" (S19). The fourth way that AI could lead to engagement was its potential in "giving immediate feedback on assignments". In some language skills like writing, "*it is amazing seeing that AI tools immediately evaluate our essays and give us feedback on various aspects of academic writing*" (S30). This fast feedback was also reiterated by S25, who stated, "*the duration from one's prompt and the provided response by AI bots and chatbots is really short and immediate. The quick feedback engages learners in the assigned task*". The last theme concerned the ability of AI technologies in "energizing traditional lessons by adding joy and fun". As maintained by a student, "*AI tools can transform traditional classes because they can add positive feelings of joy and fun to the classroom. Their adoption really engages learners in the classroom practices because they are both new and interesting to many*" (S17). Positive experiences of using AI were also reported by S24, who mentioned that "*the use of AI tools in my speaking classes was really enjoyable as the discussion questions and prompts absorbed all the students. The tools were novel and innovative for many of us and honestly, we had a funny time in that class*".

4.2. The contribution of AI to active learning (AL)

To find out the ways through which AI can contribute to AL among Chinese EFL students, the third interview question was examined. The results of thematic analysis showed six common ways by which AI tools foster AL (Figure 2). The first theme concerned the ability of AI technologies in "providing personalized and adaptive learning paths and practices". It was argued that "*AI bots in L2 classes create an adaptive learning environment for learners in which personalized language outputs are produced, which make learners active agents rather than passive consumers*" (S22). Another student said, "*AI affects the paths and practices of L2 learners by its personalized nature. This is crucial for an active approach toward education*" (S30). The next theme was related to the capacity of AI tools in "providing instant feedback" for learners. According to S2, "*AI bots and chatbots instantly and immediately provide answers to learners' questions and provide feedback that enhance their participation and active efforts in the classroom*". Furthermore, it was found that "AI facilitates peer interaction," and this contributes to learners' AL. In this regard, a student declared "*AI tools have changed and affected peer interaction styles and quality in a way that learners are more actively doing tasks and practices in the classroom collectively*" (S4).

Figure 2. *EFL Students' Perceptions about the Contribution of AI Tools to their AL*

The flexible and accessible nature of AI tools was another common reason that they could lead to AL. The theme was named "being available and flexible for learners" in the analysis. To support it, S27 stated "*AL approaches demand agency and autonomy of the learners and AI tools with their flexibility and availability, even in cellphone versions, are fostering active participation and learner voice in the journey*". The fifth extracted theme concerned the capability of AI tools in "encouraging self-paced learning" as a way to foster AL among learners. In the interviews, it was told that "*AI tools can involve learners in AL through the provision of a self-paced learning in which students are encouraged to direct their own learning process*" (S29). Another person said, "*AI technologies are individualized and this feature encourages learners to govern their learning and actively shape and reshape it*" (S18). Finally, the results of analysis indicated that AI technologies contributed to the participants' AL by "providing rich and engaging materials and activities" in the classroom. Specifically, it was maintained that "*AI is now novel and engaging for many EFL students. They can produce materials and activities for the class that are really engaging and rich in terms of language learning purposes*" (S7). Another student asserted that "AI bots can produce rich sources of language learning in speaking and writing skills, and this can make students active learners rather than passive individuals at the end of the classroom" (S25).

In sum, the results of interview data analysis revealed that Chinese EFL students perceived AI technologies as contributors to classroom engagement and AL. They pointed out that AI tools lead to classroom engagement by five practices, but six practices in terms of AL. More particularly, AI technologies contributed to the participants' engagement by 'fostering continuous learning','providing content tailored to learners' needs and levels', 'offering interactive exercises and tasks', 'giving immediate feedback on assignments', and 'energizing traditional lessons by adding joy and fun'. On the other hand, it was found that AI facilitated the students' AL by 'providing personalized and adaptive learning paths and practices','providing instant feedback', 'facilitating peer interaction', 'being available and flexible for learners', encouraging self-paced learning', and 'providing rich and engaging materials and activities'.

5. Discussion

The present study examined the perceptions of Chinese EFL students about the contributions of AI technologies to their classroom engagement and AI. In this section, each finding is discussed in relation to previous studies and theories, followed by possible explanations/justifications. The results of interview analysis showed that AI technologies could contribute to the participants' engagement by 'fostering continuous learning', 'providing content tailored to learners' needs and levels', 'offering interactive exercises and tasks', 'giving immediate feedback on assignments' and 'energizing traditional lessons by adding joy and fun'. These findings are consistent with the results reported by previous studies on the interplay of AI and learner engagement in Chinese EFL contexts (e.g., Huang et al., 2023; Wang & Xue, 2024; Yang & Zhao, 2024; Zhou & Hou, 2024). Additionally, the study supports the claim that AI technologies can extend the research scope of learner engagement (Wang & Xue, 2024). However, this study is partially in contrast with Shen and Guo (2024), who argued that AI adoption in L2 classes is neither too good nor too bad for EFL students' learning

process and emotions. This study showed that it is good for both engagement and AL. At the theoretical level, the findings are in line with TAM, which posits that the acceptance and utilization of any sort of technology relies on users' perceived usefulness and ease of implementation (Davis, 1989). Therefore, it is contented that Chinese EFL students in this study had positive attitudes towards the use of AI technologies and perceived them as useful, accessible, and manageable; they experienced classroom engagement in light of such innovative technologies.

As engagement is a positive emotional experience, the findings echo CVT of achievement emotions as well. The students considered AI use engaging, probably because they had a positive appraisal of AI technologies. Moreover, the participants' technological literacy and emotional literacy may explain the perceived close tie between AI and engagement in L2 classes. It is possible that the students had gone through AI-related training programs in China before attending this study. Another reason could be their passion and willingness to use a new language learning methodology mediated by AI, making them immersed in the classroom practices. The inherent nature of AI bots and chatbots, especially their capacity to provide immediate feedback, personalized content, level and need-based outputs, and interactive tasks in productive language skills, may also justify the obtained findings in this study. The students found AI tools engaging, probably because of such a match with their level, needs, and context. That is why they considered their adoption funny and enjoyable. The students' concern about feedback, emotions, and alignment between their expectations and teachers' practices (technology-oriented methods) may also be possible reasons for the findings.

The second finding of this study was that AI tools had facilitated Chinese EFL students' AL by 'providing personalized and adaptive learning paths and practices', 'providing instant feedback', 'facilitating peer interaction', 'being available and flexible for learners', encouraging self-paced learning', and 'providing rich and engaging materials and activities'. These areas of influence are in line with studies on the benefits of AI technologies on L2 learning (Farrokhnia et al., 2023; Pokrivcakova, 2019). The six ways through which AI could contribute to AL echo the nature and capacity of AI technologies that are personalized, adaptive, accessible, and engaging for users given their rich data provision power (Guo et al., 2022; Huang et al., 2023; Klimova et al., 2023). Additionally, the influence of AI on learners' AL is partially in agreement with previous studies that approved the role of technologies on AL. For example, Cabrera-Solano et al. (2020) and Dayag and Abdalla (2023) respectively found that mobile devices and digital portfolios could enhance EFL students' AL practices.

The findings can be attributed to the participating students' tendency to take control and ownership of their learning process and be active agents and knowledge constructors. This is in line with sociocultural theory and SSCT, which highlight the role of social interaction and knowledge generation of the learners at their own pace and worldview. Hence, the participants enjoyed and welcomed the use of AI technologies that are interactive and personalized tools at the same time. Additionally, the shift from traditional education to modern ways of learning shows that the students had been aware of social context shifts toward AI-mediated education. As AI tools are governed by individual learners, they could affect the participants' AL, a finding reported by Shen and Xu, (2015) and Mohammed and Al-hassan (2023). Learners' cognition and knowledge about what and how to learn are another possible explanation for the findings of this study. This reflects the basis of AL as noted

in the literature (e.g., Cavenagh, 2011; Daouk et al., 2016; Ryan & Martens, 1989). The students' deep engagement in the AI-mediated classes and previous experiences may justify the findings. This claim is in tune with the three key features of AL (i.e., active involvement, learning by experience, and cognitive engagement), as proposed by Skinner (2010).

6. Conclusion and Implications

This study aimed to investigate the perceptions of Chinese EFL students about the contribution of AI technologies to their classroom engagement and AL. In light of the finding, it could be concluded that AI technologies are able to influence different aspects of L2 education including engagement and AL. The study also reveals that the injection of innovative technologies to L2 education can revolutionize teaching, learning, and emotionality of EFL students in case they are properly implemented. Another conclusion is that the use of novel technologies in EFL classes can engage students in the process of their language learning and AI tools, due to their self-paced nature, can enhance their agency and independence in the process of learning. These features, in turn, make them engrossed in classroom tasks and activities and actively try to direct what and how to learn. The study calls for a shift of focus and methodology toward AI-mediated L2 education given the capacity of AI bots and chatbots in engaging learners and empower them as active knowledge producers rather than passive consumers. AI technologies have many benefits for L2 learners and L2 education, hence adopting them is suggested based on the results of this study.

The study provides evidence in support of combining theories of educational technology with affective perspectives like positive psychology. The connection between AI and emotions and practices can be capitalized by juxtaposing TAM, CVT, and positive psychology. Theories related to engagement and AL can also be expanded from traditional education to modern and digital learning environments. Practically, the findings can inform EFL teachers about the advantages and uses of adopting AI tools in L2 education, especially learners' emotional factors and self-directed practices to learn. Teachers can focus on the ways that AI could contribute to classroom engagement and AL in this study and apply them in their own classes. Teacher educators may benefit from the study by offering AI-based and AI-oriented training courses to EFL teachers and educate them how to properly implement such technologies in L2 classes to reach optimal outcomes. Practical strategies to engage EFL learners and actively encourage them take control of their own learning through AI technologies can be taught to teachers in such courses. EFL students may also draw on the findings and understand the importance of AI technologies in their psycho-effective states and learning practices in the class. Their digital literacy may enhance in light of the present study. Policy-makers can support educational institutions by providing the required facilities and support for using AI tools in L2 classes when they see how learners' learning practices and feelings are positively improved.

Researchers may also consider the present study helpful by running similar studies on the implementation of AI in L2 education. They can work on the limitations of this study. For example, they can run large scale studies instead of a small-scale study like this investigation that included only 30 EFL students. The second limitation and suggestion is the use of mixed-methods research designs rather than a pure qualitative design. One-shot

examination of the constructs could be replaced by longitudinal studies, which can indicate the changes of engagement and AL in learners over semesters. Future research can use random sampling and experimental designs to examine the effect of specific AI tools on learner engagement and language learning. The mediating role of learner-related factors like demographic, personality traits, learning styles, and proficiency level in the contribution of AI to engagement and AL could be studied in the future, as well. The voices of teachers, learners, and policy-makers can be combined to get a comprehensive image of AI integration into L2 education in future studies.

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8. Appendix

Demographics:
Age:
Gender:
Major:
Language Proficiency:

Interview Questions:

1. Have you ever used Al technologies to learn English? How was your experience?
2. In what ways does the use of AI technologies contribute to your classroom engagement? Please elaborate on your response.
3. Do you think the use of Al technologies in L2 education affects your degree of classroom participation? If yes, in what ways does AI contribute to your active learning? Please, explain your perspective.