The Impact of AI Tool Use on Continuance Intention among Adult Learners of Chinese in the United Kingdom: An Empirical Study Based on an Integrated TAM-SDT Model

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Abstract

Against the backdrop of the rapid development of generative artificial intelligence, artificial intelligence (AI) tools have gradually become important resources for adult learners of Chinese in extracurricular learning, self-directed practice, and immediate feedback. Focusing on adult learners of Chinese in the United Kingdom, this study constructs an integrated analytical framework based on the Technology Acceptance Model (TAM) and Self-Determination Theory (SDT). A questionnaire survey was used to collect 210 valid responses, and construct-level structural path analysis was conducted to examine the mechanisms through which AI tool use influences continuance intention in Chinese learning. The results show that perceived ease of use has a significant positive effect on perceived usefulness, and perceived usefulness further has a significant positive effect on continuance intention. In addition, autonomy need satisfaction, competence need satisfaction, and relatedness need satisfaction all have significant positive effects on autonomous motivation, which in turn significantly promotes continuance intention. In terms of mediation effects, perceived ease of use indirectly influences continuance intention through perceived usefulness, as well as through competence need satisfaction and relatedness need satisfaction. It also exerts significant indirect effects through autonomous motivation, whereas the indirect effect of autonomy need satisfaction is not statistically significant. The findings indicate that adult learners of Chinese are jointly influenced by technological-cognitive factors and motivational-psychological factors in their willingness to continue using AI tools. The technology acceptance path plays a more direct role, while the motivational path provides complementary explanatory power. This study argues that AI tools can become sustainable resources for Chinese learning only when they are easy to use, genuinely useful, and capable of enhancing learners' sense of competence, perceived support, and active engagement.

Keywords

AI tools, Adult learners of Chinese, Continuance intention, Technology Acceptance Model, Self-Determination Theory

Introduction

The rapid development of generative artificial intelligence is reshaping the ways in which languages are learned. Compared with traditional digital learning tools, AI can provide immediate feedback, generate examples, support conversational practice, and revise texts. It can also respond to learners' need in a highly personalized manner. As a result, the role of AI in language learning has gradually shifted from that of a general auxiliary tool to that of a learning resource that runs through the entire process of input, practice, output, and reflection [1].

This change is particularly evident in the context of international Chinese language education. Adult learners of Chinese usually display strong characteristics of autonomous learning; many of their learning activities take place outside the classroom, and their persistence depends more heavily on individual tool choice and self-regulation. Against this background, whether AI tools can be used continuously is related not only to learning efficiency but also to the stability of learning engagement. Compared with the question of whether learners are willing to try AI tools, the question of whether they are willing to continue using them better reflects learners' authentic evaluation of AI tools and their long-term learning value.

Existing research shows that the Technology Acceptance Model can effectively explain learners' adoption of digital tools, with perceived ease of use and perceived usefulness serving as important factors that influence technology use [2]. Self-Determination Theory emphasizes that the satisfaction of autonomy, competence, and relatedness need affects learners' autonomous motivation and further influences sustained engagement. However, previous studies have tended to discuss technology acceptance and learning motivation separately, and insufficient attention has been paid to the integrated mechanism of "technology perception-psychological need-continuance intention" in AI-assisted language learning. Empirical research on adult learners of Chinese in the United Kingdom remains particularly limited.

Accordingly, this study focuses on adult learners of Chinese in the United Kingdom and integrates the Technology Acceptance Model with Self-Determination Theory to examine the pathways through which AI tool use influences continuance intention. Specifically, the study analyzes the relationships among perceived ease of use, perceived usefulness, basic psychological need satisfaction, autonomous motivation, and continuance intention, with the aim of explaining more precisely how AI tools can be transformed from "usable technologies" into "learning resources worth relying on continuously". The findings are expected to provide empirical evidence for the application of AI in adult international Chinese language education.

Literature review

The technology acceptance logic of continuance intention in AI-assisted language learning

When AI tools are applied to language learning, learners' willingness to continue using them is the combined result of technology evaluation, judgments of learning benefits, and tendencies toward subsequent engagement [3]. In technology acceptance research, perceived ease of use and perceived usefulness are regarded as the two most explanatory core variables. The former reflects learners' judgments about operational thresholds and cognitive load, whereas the latter reflects learners' overall assessment of whether a tool can improve task performance, efficiency, and learning outcomes [4]. Compared with general educational software, the value of AI tools lies in whether they can provide immediate feedback, personalized support, and continuous opportunities for practice [5]. Therefore, in the context of language learning, what determines whether learners continue to use a tool is whether the tool is empirically confirmed as "worth continuing to use" [6]. This also means that if research on AI-assisted learning remains at the stage of initial adoption, it will be difficult to explain why learners incorporate AI into long-term learning practice. The basic proposition of the Technology Acceptance Model states that ease of use comes first and usefulness predominates. This proposition, together with the logic of continuance use research that subsequent behavior depends on the confirmation of post-use value, provides a clear starting point for explaining sustained engagement in AI-assisted language learning [7].

In language learning contexts, this technology acceptance logic clearly has a much stronger task-oriented character [8]. Unlike general information systems, language learning is long-term, cumulative, and highly dependent on feedback; learners' evaluations of technology are therefore more likely to be transformed into judgments about whether learning becomes more effective [9]. In areas such as machine translation, AI-supported speaking practice, and AI-enhanced learning tools, perceived usefulness is usually a more direct predictor of continuance intention, while perceived ease of use often operates indirectly by reducing usage resistance and enhancing the controllability of the tool. It can thus be seen that treating continuance intention as an outcome variable, rather than frame behavioral intention as a one-time willingness to try a tool, better fits the actual situation of AI-assisted language learning. However, using TAM alone to explain AI-assisted language learning still has limitations. Language learning is not a purely instrumental task. Learners may perceive a tool as convenient, but they may not necessarily form stable long-term engagement. Especially in out-of-class and highly autonomous learning contexts, technology evaluation often needs to be further transformed into positive learning experiences and sustained self-regulatory behavior before it can be expressed as continuance intention [10]. Therefore, to explain how AI tools move from being accepted to being continuously used, it is necessary to introduce a theoretical perspective that can account for learners' internal psychological mechanisms [11].

Motivational foundations of continuance intention: Basic psychological need satisfaction and autonomous motivation

Different from the technology acceptance logic, which emphasizes cognitive judgment, Self-Determination Theory stresses whether learners experience sufficient autonomy, competence, and relatedness support in learning activities [12]. For language learning, which requires long-term persistence, repeated practice, and a high degree of self-regulation, continuance intention is not merely a matter of behavioral intention. It is essentially a matter of motivational quality [13]. Only when learners feel that they can arrange their learning autonomously, can complete learning tasks, and receive responses and support during learning are learning behaviors more likely to shift from external drive to internal endorsement and from short-term attempts to stable persistence. A supportive environment does not automatically produce high-quality participation; what truly matters is whether the learning environment can satisfy learners' basic psychological need and thereby promote a higher level of autonomous regulation. The technological environment itself is not a direct source of motivation. Rather, its influence on learning continuity need to be realized through the deeper mechanism of psychological need satisfaction [14].

This explanation is especially important for AI-assisted language learning. AI tools are characterized by frequent interaction, immediate feedback, flexible pathways, and open resources. These features are naturally connected to the formation of autonomy, competence, and relatedness. Learners can initiate practice according to their own time, pace, and goals, thereby enhancing their sense of control over the learning process. They can gain experiences of success through immediate correction, for example generation, and task decomposition, thereby strengthening their sense of competence. They may also alleviate the feeling of isolated learning through simulated dialogue, interactive feedback, and the sharing of AI-generated outputs with teachers or peers, forming a kind of extended support experience. Existing empirical findings in language learning indicate that basic psychological need satisfaction can significantly influence learners' motivation, attitudes, and subsequent use behavior on digital language learning platforms. When a technological environment helps enhance autonomous motivation, learning performance, sustained participation, and positive emotions are also more likely to improve [15]. What AI tools truly change is not only the way learning takes place but also learners' subjective construction of the meaning of "why to continue learning" and "whether to persist".

From the perspective of the formation chain of continuance intention, there is a strong mediating logic between basic psychological need satisfaction and autonomous motivation [16]. Learners do not automatically develop stable intentions simply because technological conditions improve. Instead, continuance behavior is more likely to occur only when "the technology is more effective" is further transformed into "this is something worth doing actively". Autonomous motivation connects the key discontinuity between technological conditions and long-term engagement: one end is learners' experience of using the tool, and the other end is whether learners internalize that experience as their own learning choice [17]. This point is especially important for adult learners, whose learning relies more on self-management and value identification than on external requirements. Establishing the continuity of AI-assisted learning on the basis of autonomous motivation, rather than merely on convenience or instrumental advantages, better conforms to the operating logic of adult second-language learning.

The need to integrate TAM and SDT and the entry point of this study

Existing studies have demonstrated that the technology acceptance path can explain why learners are willing to adopt a digital tool, while the motivational path can explain why learners are willing to maintain longer-term engagement. In the new context of AI-assisted language learning, learners' judgments about the ease of use and usefulness of AI influence whether they are willing to incorporate AI into their learning resource system. Meanwhile, the sense of autonomy, competence, and support generated during AI use determines whether such technology evaluations can be further internalized as autonomous motivation and ultimately manifested as continuance intention. In other words, technology evaluation addresses whether a tool is worth using, whereas psychological need satisfaction and motivational quality address why learners continue to use it. The two dimensions are inseparable [18].

Recent research on digital language learning has gradually demonstrated this integrative trend. Stable associations have been found among out-of-class digital learning activities, second-language motivational systems, positive emotions, and subsequent engagement. These findings suggest that learners' technology use in informal learning environments is not a marginal phenomenon but an important component of language learning continuity [19]. With the arrival of the generative AI era, the role of AI in language learning has further shifted from an auxiliary tool for completing tasks to a callable resource for autonomous learning. Learners have begun to use large language models and AI conversation tools to explain language knowledge, revise output, organize expression, and extend practice. This means that AI use has become deeply embedded in self-directed learning processes. Against this background, discussing technology adoption alone is no longer sufficient to reveal the relationship between AI and continuance intention. It is necessary to place technological cognition and psychological motivation within the same explanatory framework [20].

From the perspective of the research population, this integrative perspective is especially necessary for adult learners of Chinese in the United Kingdom. Adult Chinese learning is characterized by prominent autonomous learning features, and learning activities are more likely to occur in extracurricular, fragmented, and individualized contexts [21]. Compared with structured learning at the basic education level, adult learners depend more heavily on self-regulation, goal awareness, and tool-selection ability. Therefore, the role of AI in this group is not merely to provide information or support tasks; it may also affect learners' sense of control, confidence, and support experience. However, existing empirical studies on AI language learning are mainly concentrated in English learning, translation learning, or general foreign language learning contexts. Adult learners of Chinese, especially overseas learners represented by those in the United Kingdom, have received insufficient attention. The absence of this target population, the separation of theoretical perspectives, and the limited focus on continuance intention jointly constitute the current research gap. Accordingly, incorporating perceived ease of use, perceived usefulness, autonomy need satisfaction, competence need satisfaction, relatedness need satisfaction, autonomous motivation, and continuance intention into a single analytical framework not only responds to the developmental trend of AI-assisted language learning research from adoption to continuance. It also provides more explanatory empirical evidence for AI applications in adult international Chinese language education.

Method

Research design and participants

This study adopted a questionnaire survey and structural equation analysis to examine the pathways through which the use of AI tools by adult learners of Chinese in the United Kingdom influences continuance intention. The participants were adult learners who lived in the United Kingdom, were at least 18 years old, learned Chinese as a non-native language, and had used AI tools to support Chinese learning within the previous three months. To ensure that the sample was consistent with the research purpose, the beginning of the questionnaire included screening questions on informed consent, age, place of residence, learner identity, and AI use experience. Only respondents who met the criteria proceeded to the formal questionnaire.

The questionnaire was distributed online, and 210 valid responses were ultimately obtained. Basic sample information included length of Chinese learning, Chinese proficiency level, frequency of AI tool use, main use scenarios, and educational background. Because this study focuses on the mechanism of continuous AI tool use in adult Chinese learning, the participants had clear relevance to the research objective and contextual fit.

Instrument

This study used a self-developed questionnaire to collect data. The questionnaire was designed on the basis of the Technology Acceptance Model (TAM) and Self-Determination Theory (SDT). It consisted of three parts: screening questions, background information questions, and core scale items.

The core scale covered seven latent variables: perceived ease of use, perceived usefulness, autonomy need satisfaction, competence need satisfaction, relatedness need satisfaction, autonomous motivation, and continuance intention. Perceived ease of use and perceived usefulness were used to reflect learners' evaluation of the technological attributes of AI tools.

Autonomy need satisfaction, competence need satisfaction, and relatedness need satisfaction were used to measure the extent to which basic psychological need were satisfied during AI tool use. Autonomous motivation reflected learners' active endorsement of AI-assisted Chinese learning. Continuance intention measured learners' tendency to continue using AI tools to support Chinese learning in the future. Each latent variable was measured by four items, resulting in 28 core scale items.

The questionnaire was designed bilingually in Chinese and English to accommodate the language background of adult learners of Chinese in the United Kingdom. All scale items were scored on a five-point Likert scale, where 1 indicated "strongly disagree" and 5 indicated "strongly agree". In addition, one attention-check item was included to improve data quality. Background variables mainly included length of Chinese learning, Chinese proficiency level, frequency of AI use, main use scenarios, and highest level of education.

Data collection and processing

Before the formal survey, the wording of the questionnaire was checked and adjusted to ensure that the Chinese and English versions were semantically consistent and that the items matched the research context. The formal survey was conducted anonymously online, and participants answered independently according to their own circumstances. To reduce invalid responses, screening questions prevented ineligible respondents from entering the formal scale section, and the attention-check item was used to identify low-quality responses.

After data collection, the sample was first organized and cleaned, including checking screening conditions, examining response completeness, and identifying abnormal responses. The items were then coded, and scores were calculated by construct. To ensure the validity of subsequent statistical analysis, this study conducted reliability and validity tests before formal path testing and made appropriate model adjustments where necessary.

Data analysis

SPSS and structural equation analysis methods were used to process the data. First, descriptive statistics were used to analyze the basic characteristics of the sample and the mean and standard deviation of each variable. Second, reliability and validity tests were conducted for the scale, including Cronbach's α, composite reliability, and convergent validity, to examine the internal consistency and structural appropriateness of the measurement instrument.

On this basis, path analysis was further conducted to test the relationships among the latent variables. Specifically, the model treated perceived ease of use, perceived usefulness, autonomy need satisfaction, competence need satisfaction, relatedness need satisfaction, and autonomous motivation as antecedent variables, and continuance intention as the outcome variable. It examined the direct and indirect effects of AI tools on continuance intention. Considering that this study focuses on the relationships among the core variables in the integrated model, construct-level structural path testing was adopted to improve the clarity and stability of model interpretation. Finally, the hypotheses were evaluated based on path coefficients and significance levels, and the results were interpreted in relation to the theoretical framework.

Results

Descriptive statistics and correlation analysis

The means of all core variables were higher than the scale midpoint, indicating that the respondents generally held a positive attitude toward AI-assisted Chinese learning. "Relatedness need satisfaction" had the highest meaning (M=4.03), while "perceived usefulness" had a relatively lower meaning (M=3.88), although the overall differences were small.

Significant positive correlations were observed among all variables, providing a basis for subsequent path analysis.

Table 1. Descriptive statistics and reliability results for core variables.

Variable	Abbreviation	Mean	SD	Cronbach's α
Perceived ease of use	PEOU	3.93	0.58	0.407
Perceived usefulness	PU	3.88	0.50	0.493
Autonomy need satisfaction	AUT	3.89	0.66	0.511
Competence need satisfaction	COMP	3.99	0.56	0.483
Relatedness need satisfaction	REL	4.03	0.56	0.270

Variable	Abbreviation	Mean	SD	Cronbach's α
Autonomous motivation	AM	3.93	0.60	0.428
Continuance intention	CI	3.94	0.60	0.454

As shown in Table 1, the reliability results indicate that the internal consistency of each dimension was generally modest.

Therefore, the subsequent analysis did not adopt a strict item-level latent variable model as the final presentation. Instead, construct means were calculated based on the items belonging to each latent variable, and path analysis was conducted at the construct level. This approach was more conducive to presenting the relationships among variables in a stable manner.

Table 2. Correlation matrix for core variables.

Variable	PEOU	PU	AUT	COMP	REL	AM	CI
PEOU	1.000	/	/	/	/	/	/
PU	0.522	1.000	/	/	/	/	/
AUT	0.461	0.562	1.000	/	/	/	/
COMP	0.346	0.520	0.365	1.000	/	/	/
REL	0.271	0.441	0.330	0.422	1.000	/	/
AM	0.438	0.457	0.302	0.414	0.350	1.000	/
CI	0.457	0.483	0.458	0.391	0.407	0.329	1.000

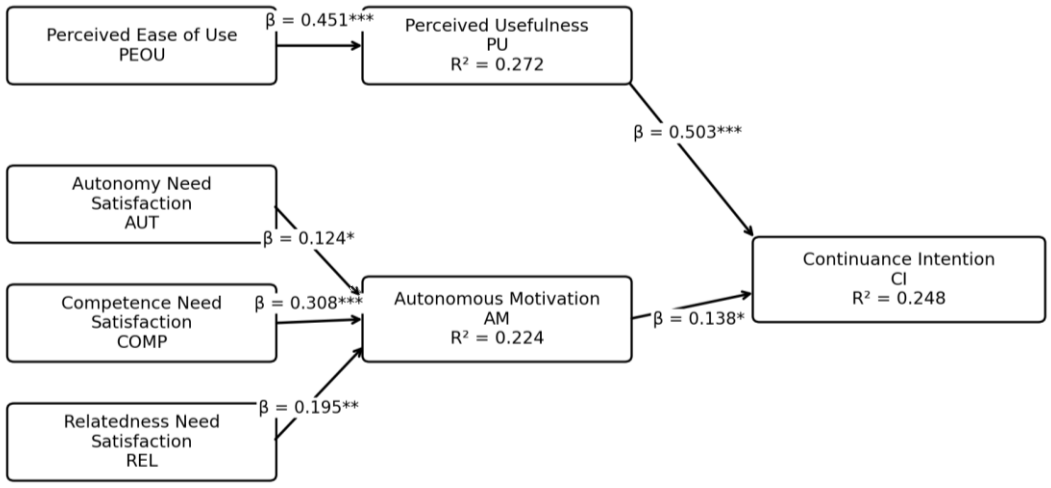
As shown in Table 2, perceived ease of use was strongly correlated with perceived usefulness, and perceived usefulness was also positively correlated with continuance intention. Autonomy, competence, and relatedness need satisfaction were all positively correlated with autonomous motivation and continuance intention. These results are generally consistent with theoretical expectations.

Path analysis results

At the construct level, this study built the following integrated model: Perceived ease of use predicts perceived usefulness; autonomy need satisfaction, competence need satisfaction, and relatedness need satisfaction jointly predict autonomous motivation; and perceived usefulness and autonomous motivation further predict continuance intention.

Table 3. Structural path test results.

Hypothesized path	Standardized coefficient β	p value	Result
PEOU → PU	0.451	<0.001	Supported
AUT → AM	0.124	0.043	Supported
COMP → AM	0.308	<0.001	Supported
REL → AM	0.195	0.009	Supported
PU → CI	0.503	<0.001	Supported
AM → CI	0.138	0.045	Supported



Note: *p<0.05, **0.01, ***p<.0.001.

Figure 1. SEM structural path diagram.

The corresponding explanatory rates were $R^2 = 0.272$ for PU, $R^2 = 0.224$ for AM, and $R^2 = 0.248$ for CI. As shown in Table 3 and Figure 1, perceived ease of use had a significant positive effect on perceived usefulness, indicating that the easier AI tools are to learn and operate, the more likely learners are to regard them as helpful for Chinese learning. At the same time, autonomy need satisfaction, competence need satisfaction, and relatedness need satisfaction all had significant positive effects on autonomous motivation. Among them, competence need satisfaction had the strongest effect, suggesting that whether learners can better complete learning tasks with the help of AI is an important basis for promoting their active willingness to use AI. Furthermore, both perceived usefulness and autonomous motivation had significant positive effects on continuance intention, with the direct effect of perceived usefulness being stronger. This indicates that learners' willingness to continue using AI tools first depends on whether they believe the tools are truly helpful for learning, and second on whether they subjectively endorse this learning approach.

Mediation effect results

To further test indirect effects, this study used the bootstrap method for mediation analysis. The results are shown in Table 4.

Table 4. Mediation effect test results.

Indirect path	Indirect effect	95% CI	Result
PEOU → PU → CI	0.227	[0.135, 0.330]	Significant
AUT → AM → CI	0.018	[-0.002, 0.050]	Not significant
COMP → AM → CI	0.043	[0.004, 0.096]	Significant
REL → AM → CI	0.028	[0.001, 0.071]	Significant

As shown in Table 4, perceived ease of use significantly and indirectly influenced continuance intention through perceived usefulness. This indicates that the ease of use of AI tools does not directly translate into a tendency toward continued use; rather, it mainly operates by strengthening learners' judgments of tool value. Within the SDT pathway, both competences need satisfaction and relatedness need satisfaction significantly and indirectly influenced continuance intention through autonomous motivation, whereas the indirect effect of autonomy need satisfaction did not reach statistical significance. This suggests that in the current sample, learners' sense of competence and support was more likely to be transformed into continuance intention through motivational mechanisms.

Summary of results

In summary, the integrated model constructed in this study received relatively stable support. The influence of AI tools on continuance intention among adult learners of Chinese in the United Kingdom was realized mainly through two pathways. The first was the technology acceptance path centered on "perceived ease of use-perceived usefulness-continuance intention". The second was the motivational path centered on "basic psychological need satisfaction-autonomous motivation-continuance intention". Among these, the technology acceptance path had a stronger effect, while the motivational path played a complementary explanatory role. This suggests that AI tools can become sustainable learning resources for Chinese not only because they are easy to use and helpful for improving learning outcomes, but also because they can strengthen learners' sense of competence and relatedness support and further enhance their autonomous motivation.

Discussion

Findings

This study analyzed the continuance intention of adult learners of Chinese in the United Kingdom in relation to AI tool use. The results show that the influence of AI tools on continuance intention is not a single-path process; rather, it operates simultaneously through a technological-cognitive path and a motivational-psychological path. Specifically, perceived ease of use significantly and positively influenced perceived usefulness, and perceived usefulness further significantly and positively influenced continuance intention. Meanwhile, autonomy need satisfaction, competence need satisfaction, and relatedness need satisfaction all significantly and positively influenced autonomous motivation, and autonomous motivation further positively influenced continuance intention.

Overall, AI tools can become sustainable resources for Chinese learning. On the one hand, learners perceive them as easy to use and genuinely helpful. On the other

hand, these tools can enhance learners' sense of autonomy, competence, and support, thereby increasing their subjective willingness to continue engaging in learning.

First, the technology acceptance path was more stable in this study, indicating that for adult learners of Chinese in the United Kingdom, whether AI tools genuinely have learning value remains the key factor determining continuance intention. The significant effect of perceived ease of use on perceived usefulness suggests that low usage thresholds and high controllability directly influence learners' judgments of learning value. For adult learners, learning time is often fragmented, and learning tasks depend heavily on individual initiative. Therefore, if AI tools are difficult to operate, provide unclear feedback, or impose high usage costs, they may not be incorporated into long-term learning practice even when their functions are powerful. Conversely, when learners can master AI tools with relative ease and experience their support for vocabulary, grammar, reading, writing, or speaking practice in actual use, their continuance intention increases markedly. This shows that in AI-assisted international Chinese language education, the primary condition that truly promotes continuous use remains the actual effectiveness of the tool rather than the novelty of the technology itself.

Second, the significant effect of basic psychological need satisfaction on autonomous motivation indicates that the influence of AI tools does not remain at the instrumental level but enters learners' motivational structure. Among the predictors, competence need satisfaction had the strongest relative effect, indicating that whether learners can better complete learning tasks with the assistance of AI and thereby feel more confident is an important psychological foundation for adult learners of Chinese to develop an active willingness to use AI. Relatedness need satisfaction was also significant. This suggests that although AI tools are not interpersonal interaction partners in the traditional sense, the immediate feedback, conversational practice, and supportive experiences they provide may to some extent reduce learners' sense of isolation and enhance their perceived support. Although the effect of autonomy need satisfaction was relatively weaker, it was still significant, indicating that the personalized pathways and flexible use provided by AI tools can bring adult learners a certain sense of control over learning. Thus, the influence of AI tools on continuance intention is not achieved simply by improving efficiency; rather, it gradually shapes learners' perceptions of their own learning ability, learning control, and learning support during use.

Third, the significant effect of autonomous motivation on continuance intention shows that whether learners subjectively endorse AI-assisted learning is an important mediating link in the formation of continuous use. Technology can be used without necessarily being internalized as a long-term learning method. Only when learners truly recognize the value of AI tools in Chinese learning and are willing to actively make AI part of their own learning does continuance intention become more stable. Therefore, the results of this study also indicate that relying solely on the Technology Acceptance Model is insufficient when explaining AI-assisted language learning behavior. Examining whether learners regard AI tools as useful can explain whether they are willing to continue using them, but introducing Self-Determination Theory can further explain why they are willing to continue using them. This reflects the complementarity of TAM and SDT and demonstrates the necessity of integrating technological cognition and psychological motivation to understand the sustainability of AI-assisted language learning.

The learning context of adult learners of Chinese in the United Kingdom further reinforces this interpretation. Compared with ordinary classroom learners, adult learners show greater individual differences in learning goals, learning pace, and modes of engagement, and their learning activities take place more often outside class and in self-arranged situations. This means that AI tools are not merely supplementary resources for traditional instruction; they function more like learning support systems that can be called upon at any time. For this reason, learners' judgments of AI tools do not stop at whether the tools can be used; they focus more on whether the tools suit them, whether the tools are worth continued investment, and whether the tools can genuinely help them persist in learning. The results obtained in this study reflect precisely the logic of AI tool use in adult autonomous learning contexts.

Implications

This study has several theoretical implications. First, research on the continuous use of AI-assisted language

learning cannot be sufficiently explained from the perspective of technology acceptance alone. Although perceived ease of use and perceived usefulness can explain learners' basic evaluations of AI tools, they cannot fully reveal the formation mechanism of continuance intention. Incorporating basic psychological need satisfaction and autonomous motivation into the analysis helps connect "tool evaluation" with "learning internalization", thereby offering a more complete explanation of how AI tools are transformed from external resources into supports for continued learning. Second, this study shows that an integrated TAM-SDT framework is applicable to explaining the AI tool use behavior of adult learners of Chinese, providing a new analytical perspective for interdisciplinary research on international Chinese language education and educational technology.

This study also has practical implications. For AI tool designers, greater attention should be paid to operability, clarity of feedback, and alignment with learning tasks. Designers should reduce learners' usage thresholds and strengthen the practical assistance that tools provide for Chinese learning. For international Chinese language education practice, teachers should not introduce AI only as a question-answering or translation tool. Instead, they should guide learners to use AI for organizing practice, obtaining feedback, supporting oral expression, and monitoring their own learning, helping learners develop a sense of competence improvement and autonomous control during use. For adult learners of Chinese themselves, the value of AI tools lies not merely in saving time but in supporting long-term, stable, and sustainable autonomous learning.

Limitations and future research

This study still has several limitations. First, it used cross-sectional questionnaire data. Although such data can reveal relationships among variables, caution is needed when interpreting causal directions. Future studies could combine longitudinal tracking or experimental designs to provide further verification. Second, the sample was mainly composed of adult learners of Chinese in the United Kingdom. This target group gives the study strong contextual specificity, but it also limits the generalizability of the conclusions. Subsequent research could extend the analysis to Chinese learners in other countries or to different types of Chinese learners. Third, this study relied mainly on learners' self-reported data. Future research could combine actual usage records, interview data, or learning behavior data to conduct a more in-depth analysis of the mechanisms of AI tool use. Fourth, AI tools vary considerably in type. Different tools differ in feedback methods, interaction modes, and learning-support functions. Future studies could further distinguish tool types and compare the differential roles of different AI tools in promoting continuance intention.

Conclusion

As generative artificial intelligence increasingly enters language learning contexts, AI tools are profoundly changing the ways adult learners of Chinese learn and are also reshaping the basic logic of "resources-practice-feedback-persistence" in international Chinese language education. Focusing on adult learners of Chinese in the United Kingdom, this study analyzed the relationship between AI tool use and continuance intention. The findings show that learners' willingness to use AI tools over the long term does not depend merely on the novelty of the tools themselves. More importantly, it depends on whether the tools are truly easy to use and able to generate learning value, and whether they can enhance learners' sense of competence, support, and active engagement during use. Therefore, the significance of AI in Chinese learning should not be understood only as a technical means for improving efficiency. It should also be regarded as an important educational resource that may influence learning continuity and learning experience.

For the future of international Chinese language education, the application of AI tools should not remain at the level of functional introduction; it should move further toward optimizing learning support mechanisms. Teachers, curriculum designers, and tool developers need to pay joint attention to how to reduce usage thresholds, improve feedback quality, enhance task alignment, and, on this basis, help learners establish more stable learning confidence and more positive learning identification. Only when AI tools possess technological usability and can respond to learners' psychological need for autonomy, competence, and relatedness can they truly become an important force supporting the long-term persistence of adult Chinese learning. It is hoped that this study can provide a useful reference for theoretical

discussion and practical exploration in AI-empowered international Chinese language education and can further inspire subsequent research integrating adult Chinese learning, technology acceptance, and learning motivation.

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Conflicts of Interest

The author declares no conflict of interest.

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