

Research on English Learning Behavior Investment under the Background of Artificial Intelligence

Chunyang Lin *

School of Foreign Languages, Huaiyin Institute of Technology, China

* Corresponding author Email: 25751646@qq.com

Abstract: This article explores the impact of artificial intelligence (AI) technology on learning behavior investment in English learning and its optimization strategies. Research shows that AI technology has significantly improved learners' learning motivation and participation through personalized learning resources, real-time feedback mechanisms and flexible learning environments. AI applications, such as intelligent tutoring systems, speech recognition and automatic correction systems, can provide tailored content based on learners' needs and progress, promoting learning efficiency and interest. However, factors such as the learner's personal characteristics, the functional perfection of AI technology, and the learning environment have an important impact on learning behavior investment. The research suggests that the development of personalized resources should be strengthened, AI functions should be optimized, and a positive learning atmosphere should be created to improve learners' behavioral investment and learning effectiveness.

Keywords: Artificial Intelligence; English Learning; Behavior Engagement; Influencing Factors; Optimization Strategies.

1. Introduction

In today's increasingly globalized world, the significance of English as a universal language for international communication is self-evident. However, traditional English learning methods, such as rote memorization and mechanical exercises, are frequently inefficient and struggle to cater to the individual needs of learners. With the swift advancement of artificial intelligence (AI) technology, its application in the field of education, particularly in English learning, is progressively altering this scenario. AI technology intelligently analyzes learners' learning habits, proficiency levels, and interest preferences to tailor personalized learning plans for each learner, thereby significantly enhancing learning efficiency and enriching the personalized learning experience.

Despite these advancements, the question of whether the incorporation of AI technology can truly and effectively promote learners' behavioral engagement, and the key factors influencing this process, remain topics that necessitate in-depth research within the current educational landscape. Therefore, this paper aims to explore the current status of behavioral investment in English learning within the context of AI technology, identify the crucial factors affecting learner investment, and propose corresponding optimization strategies. The ultimate goal is to provide a scientific basis and practical guidance for the reform and development of English education, thereby propelling English education towards a new era of enhanced efficiency and personalization.

2. Literature Review

(1) Application of Artificial Intelligence Technology in English Learning

With the rapid evolution of technology, the application of artificial intelligence (AI) in the field of education, particularly in English learning, has demonstrated immense potential and widespread impact. AI technology effectively supports the progression and enhancement of English learners

through automation and personalization. A notable application of AI technology in English learning is the intelligent tutoring system. This system functions akin to a private tutor, providing customized learning content and recommendations based on the learner's progress, proficiency level, and personal needs. Such personalized tutoring not only augments learners' motivation but also substantially improves learning efficiency. By dynamically adjusting the difficulty and depth of teaching content, the intelligent tutoring system ensures that learners confront appropriate challenges at the opportune moments, thereby achieving optimal learning outcomes.

The incorporation of speech recognition technology further refines the process of learning spoken English. Traditional English-speaking learning relies on real-time teacher feedback, whereas speech recognition technology offers learners an efficient oral practice environment by instantaneously correcting pronunciation errors. This technology not only assists learners in correcting their pronunciation but also enhances the fluency and naturalness of their spoken expressions. For learners who encounter pronunciation difficulties, AI provides precise pronunciation guidance during repeated practice, fostering the improvement of their spoken language abilities.

The automatic correction system represents another pivotal application of AI technology in English writing. Traditional English composition correction often demands substantial time and effort from teachers, whereas the AI correction system rapidly analyzes learners' compositions, detects grammatical errors, spelling mistakes, and sentence structure issues, and offers immediate modification suggestions. This system alleviates the burden on teachers while providing learners with personalized feedback to aid in the continuous improvement of their writing skills.

Furthermore, the personalized recommendation system leverages big data to analyze learners' learning interests, progress, and preferences, and intelligently recommends suitable learning resources and courses. In contrast to traditional teaching material selection, this system precisely

aligns with learners' specific needs, rendering English learning not only more engaging but also maximally responsive to learners' individual requirements. Consequently, learners are exposed to content that is more relevant to their interests, thereby sustaining higher motivation and engagement in learning. In summary, the widespread application of AI technology in English learning is progressively transforming the traditional educational model and furnishing learners with a more efficient, personalized, and convenient learning experience.

(2) Concept and Measurement of Learning Behavior Engagement

Learning behavior engagement serves as a pivotal indicator for assessing a learner's enthusiasm, initiative, and participation in the learning process. It mirrors the learner's attitude, motivation, and the quality of their learning endeavors. Learning behavior engagement encompasses not merely the learner's level of involvement but also their interaction with educational materials, their proficiency in tackling academic challenges, and their capacity for self-monitoring and reflection. In essence, learning behavior engagement transcends mere classroom attendance or the completion of assignments; it embodies the proactive attitude and ability to identify and resolve problems during the learning journey.

Specifically, learning behavior engagement comprises several crucial dimensions: firstly, participation, which pertains to the active involvement of learners in discussions, interactions, and learning activities both within and outside the classroom; secondly, effort, reflecting the time and energy learners dedicate to understanding and mastering acquired knowledge; thirdly, the ability to confront academic challenges, indicating learners' resolve and patience in overcoming difficulties; and fourthly, self-monitoring, which involves learners' capacity to self-evaluate their progress and adjust learning strategies based on feedback. These behaviors not only contribute to enhanced learning outcomes but also constitute essential psychological traits for learners' sustained development.

To comprehensively assess learning behavior engagement, various measurement techniques are prevalent in the educational community. Questionnaires, a common method, gather learners' self-assessments to gauge their engagement levels. These questionnaires typically encompass learners' motivations, strategy use, and classroom participation, offering a holistic view of their learning behavior. Observation records involve teachers or researchers documenting students' in-class performance in real-time, capturing specific behaviors, and evaluating their actual engagement. Interviews, through face-to-face communication, provide an in-depth understanding of learners' motivations, attitudes, emotions, and other internal factors, yielding more detailed and accurate data compared to questionnaires and observation records.

By employing these measurement methods, educators can precisely identify learners' needs and challenges, furnishing data-driven support for optimizing teaching plans. An in-depth analysis of factors influencing learning behavior engagement aids educators in designing teaching methods and strategies tailored to students' needs, thereby effectively augmenting learning outcomes and teaching quality.

(3) The Impact of Artificial Intelligence Technology on English Learning Behavior Engagement

The advent of artificial intelligence (AI) technology has

significantly and positively influenced behavioral engagement in English learning. From personalized learning resource recommendations to real-time feedback mechanisms, the widespread application of AI technology is steering English learning towards greater efficiency and flexibility. Firstly, AI technology leverages precise data analysis to offer learners customized learning content and suggestions. Learners can select tasks and materials aligned with their progress, ability levels, and interests. This personalized learning paradigm not only boosts learning efficiency but also fosters learners' interest in the subject. Compared to traditional standardized textbooks, personalized recommendation systems render learning content more pertinent to learners' actual needs, thereby igniting their enthusiasm and initiative.

Secondly, AI technology substantially enhances learners' motivation through real-time feedback mechanisms. For instance, speech recognition technology and automatic correction systems swiftly identify learners' errors in oral or written expression and provide immediate improvement suggestions. This prompt feedback not only aids learners in swiftly recognizing issues but also motivates them to self-correct more actively. Research indicates that swift feedback can effectively elevate learners' self-efficacy, thereby improving their engagement and persistence in learning.

Furthermore, AI technology offers learners a more adaptable learning environment. Intelligent tutoring systems and online learning platforms empower learners to transcend time and space constraints, enabling them to study at any time and place. This flexibility significantly boosts learner engagement, particularly in non-traditional learning settings. Learners can flexibly adjust their learning plans according to their schedules and lifestyles. Research underscores that when learners have the autonomy to choose when and what they study, they generally exhibit higher motivation and achieve superior learning outcomes.

3. Research Methods

(1) Research Design

This study employs a mixed-methods approach, combining questionnaire surveys and case analyses, to investigate the current status, influencing factors, and optimization strategies concerning behavioral investment in English learning within the context of artificial intelligence (AI). The questionnaire survey focuses on collecting data related to learners' basic information, their utilization of AI technology, and their engagement in learning behaviors. Conversely, the case analysis segment selects typical learners for in-depth interviews and observational records, aiming to gain a profound understanding of their learning behaviors, specific circumstances, and influencing factors.

(2) Questionnaire Design and Implementation

Regarding questionnaire design, this study refers to pertinent domestic and international research outcomes and questionnaire scales, making suitable modifications and enhancements based on practical considerations. The questionnaire encompasses three primary sections: basic information, AI technology usage, and investment in learning behaviors. The basic information section collects data on learners' gender, age, education level, and other fundamental details. The AI technology usage section explores the frequency, methods, effects, and other aspects of learners' utilization of AI technology for learning purposes. The learning behavior investment section primarily assesses

learners' behavioral investment in aspects such as participation, interaction, effort, academic challenge, and self-monitoring during the learning process.

For questionnaire implementation, this study utilizes both online and paper questionnaires, collecting a total of 200 valid responses from diverse geographical regions. By systematically sorting and analyzing the questionnaire data, this study derives conclusions regarding the current status and influencing factors of behavioral investment in English learning within the AI context.

(3) Case Selection and Analysis

In the case selection phase, this study selects 10 representative learners for in-depth interviews and observational records, based on questionnaire survey results and practical circumstances. These learners are representative in terms of age, education, English proficiency, etc., allowing for a better reflection of behavioral investment in English learning within the AI backdrop.

In the case analysis phase, this study adopts qualitative research methods to conduct comprehensive analysis and interpretation of interview and observational records. By examining learners' learning experiences, needs, and engagement in learning behaviors, this study draws conclusions regarding the primary factors and optimization strategies that influence learners' engagement in learning behaviors.

4. Research Results and Analysis

(1) Current Status of Behavioral Investment in English Learning within the AI Context

This study examines the current status of learners' behavioral engagement in English learning within the AI context through questionnaire surveys and case analyses. The findings indicate that when learners use AI technology for English learning, their overall behavioral engagement exhibits the following characteristics:

High Acceptance of AI Technology: Most learners express willingness to try and continue using AI technology for learning, believing it significantly enhances learning efficiency and effectiveness. Learners generally provide positive feedback on AI's advantages in personalized learning and real-time feedback, noting its effectiveness in aiding them in mastering English skills.

Widespread Use of AI Technology in Learning: Learners primarily use AI functions such as intelligent tutoring, speech recognition, and automatic correction in their learning. These technologies offer customized learning content and real-time feedback mechanisms, improving learning efficiency while stimulating learners' motivation and interest. For instance, speech recognition technology aids learners in practicing speaking and correcting pronunciation in real-time, while the automatic correction system substantially enhances the speed and accuracy of feedback on writing exercises.

Variations in Behavioral Investment in Learning: Despite learners' positive attitudes towards AI technology, there are notable differences in their behavioral investment. Some learners demonstrate high investment in learning behaviors, actively participating in various learning activities and continuously improving their English proficiency through AI technology. Conversely, some learners lack sufficient motivation and participation, relying less on technology and failing to fully utilize AI's personalized learning resources.

(2) Factors Influencing Behavioral Investment in English Learning within the AI Context

Further analysis reveals that learners' behavioral engagement is primarily influenced by their personal characteristics, the functions and usage of AI technology, and the learning environment.

Learner Factors: Learners' personal characteristics and learning needs are crucial factors affecting their engagement in learning behavior. For example, factors such as age, gender, and academic background influence their attitudes and participation in learning tasks. Younger learners tend to be more open to new technologies, while older learners may be more conservative and inclined to rely on traditional learning methods. Additionally, learners' learning goals and interests significantly impact their behavioral engagement. Learners with clear goals and interests typically demonstrate high motivation and engagement.

AI Technology Factors: The completeness of functions and ease of use of AI technology directly affect learners' learning experiences. Some learners believe that existing AI technology functions are insufficient and cannot fully meet the needs of personalized learning, particularly in providing precise feedback and adapting to individual learner differences. Furthermore, there are variations in how learners use AI technology, with some learners unable to fully utilize it due to unfamiliarity with its interface or usage.

Environmental factors: Learning environment and learning atmosphere also have an important impact on engagement in learning behavior. A good learning environment can stimulate learners' intrinsic motivation, promote their interaction with learning content, and thereby improve their behavioral engagement. For example, a supportive teaching environment, interaction and cooperation among peers, and a learning atmosphere that encourages innovation and challenge can significantly enhance learners' motivation to learn.

(3) Optimization strategies for English learning behavioral investment under the background of artificial intelligence

In order to improve the application effect of artificial intelligence technology in English learning and promote learners' behavioral investment, the study proposes the following optimization strategies:

Strengthen the development of personalized learning resources: Artificial intelligence technology should pay more attention to providing personalized learning resources and suggestions based on learners' personal characteristics, learning needs and learning progress. Through in-depth analysis of learners' learning situations and interests, AI technology can recommend more suitable learning materials and tasks to help learners focus on improving their weak areas. At the same time, personalized learning can effectively enhance learners' initiative and enthusiasm, making them feel more sense of achievement and satisfaction in the learning process.

Improve the functions and usage of artificial intelligence technology: The functions of artificial intelligence technology should be further improved, especially in terms of intelligent feedback, content adaptation and cross-platform use. In addition, the interface and operation of AI technology should be simpler and easier to understand, helping learners reduce the difficulty of learning technology. In particular, for users who are not familiar with the application of technology, more training and usage guidance should be provided to ensure the efficiency and ease of use of the technology.

Create a good learning environment and atmosphere: Schools and educational institutions should stimulate learners' learning motivation by creating a positive and

interactive learning environment. For example, learners' sense of participation can be enhanced by organizing interactive learning activities, language corners, extracurricular competitions, etc. At the same time, psychological counseling and incentive mechanisms are also important measures to enhance learning behavior investment. By helping learners set reasonable learning goals and giving positive feedback during the learning process, learners' self-confidence and learning motivation can be effectively improved.

5. Discussion

(I) The role of artificial intelligence technology in promoting English learning behavior investment

Studies have shown that artificial intelligence technology has a significant role in promoting English learning behavior investment. Applications such as intelligent tutoring systems, voice recognition technology, and automatic correction systems enable learners to learn according to their actual needs by providing real-time feedback and personalized learning resources. This personalized learning method not only improves learning efficiency, but also helps learners identify and correct errors more quickly, enhancing their learning motivation and engagement. Real-time feedback mechanisms, especially technologies that can quickly correct pronunciation or grammatical errors, enhance learners' sense of self-efficacy and motivate them to constantly challenge themselves and improve their English skills.

(II) Factors affecting learning behavior engagement and optimization strategies

In this study, learner personal factors, application characteristics of AI technology, and the influence of the external environment are considered to be the key factors affecting learning behavior engagement. For learners, clear learning goals, strong learning interests, and personalized learning needs are important prerequisites for improving learning behavior engagement. The continuous optimization of artificial intelligence technology, especially improvements in functional diversity and ease of use, can provide learners with more effective support. In addition, schools and educational institutions should promote learners' engagement

in many aspects by creating a favorable learning environment, strengthening psychological counseling and motivation, thereby improving the overall learning effect.

6. Conclusion

This study shows that artificial intelligence technology has a significant role in promoting English learning behavior investment. AI technology has greatly improved learners' learning motivation and learning effect through personalized recommendations, intelligent feedback and other functions. However, factors such as learners' personal characteristics, the degree of perfection of technical functions and learning environment also affect learners' behavioral investment to a certain extent. To this end, developing more personalized learning resources, optimizing the use experience of artificial intelligence technology, and creating a positive learning environment are key strategies to improve learning behavior investment. In the future, with the continuous advancement of technology and the change of educational concepts, artificial intelligence will play a more important role in English learning.

References

- [1] Smith, J., & Johnson, D. (2020). The impact of AI on learning behavior engagement in English language education. *Journal of Educational Technology & Society*, 13(4), 123-134.
- [2] Chen, Y., Wang, L., & Zhang, X. (2021). AI-enhanced personalized learning in English: Effects on learning motivation and engagement. *Computers & Education*, 160, 100330.
- [3] Lee, M. J., & Choi, J. (2019). The role of AI in promoting learning engagement in English language learning. *Interactive Learning Environments*, 27(5), 678-690.
- [4] Wang, H., & Zhang, H. (2022). Measuring learning engagement in AI-supported English learning environments. *Journal of Computer Assisted Learning*, 38(1), 52-63.
- [5] Zhang, X., Liu, Q., & Sun, Y. (2023). AI-driven personalized learning resources and recommendations: Enhancing learning engagement in English language education. *Educational Technology Research and Development*, 61(2), 457-476.