

A Study on High School Students' Continuance Intention to Use ChatGPT for Learning Assistance: An Exploration Based on Self-Determination Theory

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Abstract: This study delves into the motivations of high school students when using ChatGPT for learning support and their intention to continue its use. With a focus on the moderating role of AI literacy, the research is based on the Self-Determination Theory. It suggests that achievement motivation and challenge motivation positively influence the intention to continue using ChatGPT, and that AI literacy amplifies these effects. Through a questionnaire survey of second- and third-year students at a high school in Kaohsiung, Taiwan, this research aims to uncover effective ways to integrate AI technology into education and enhance students' learning and development.

Keywords: Self-Determination Theory, ChatGPT, AI literacy, High School, Continuance Intention

1. Introduction

As AI technology develops and advances, it gradually integrates into various aspects of human life. In education, particularly at the high school level, the application of AI technology not only enhances the quality of teaching but also changes traditional learning methods. Compared to traditional search engines, students are increasingly relying on advanced AI tools like ChatGPT. As the most advanced AI chatbot currently available, ChatGPT has learned from a vast amount of training data, possesses an extensive knowledge base, and exhibits excellent language comprehension abilities, enabling it to efficiently help students solve various learning problems, such as programming issues (Md. Mostafizer Rahman et al., 2023), translating articles, and refining texts (Brown et al., 2020). In this context, ChatGPT is being used to supplement high school students' coursework, providing more direct solutions and detailed analyses, helping students understand the reasons behind their mistakes, and further improving their learning outcomes (Brown et al., 2020). This study aims to analyze high school students' behavior patterns when using ChatGPT in their coursework through the lens of the Self-Determination Theory (SDT).

SDT emphasizes the impact of intrinsic and extrinsic motivation on individual behavior, with this study focusing on challenge motivation and achievement motivation as key variables that may influence students' continuance intention to use ChatGPT (Amabile et al., 1994; Lai et al., 2018; Ryan & Deci, 2000). Within these behavior patterns, AI literacy acts as a moderating variable that may significantly impact students' decisions to choose and continue using ChatGPT. AI literacy includes understanding the basic concepts of AI, its technical applications, and ethical considerations. Students with higher AI literacy may be able to fully utilize ChatGPT, thereby enhancing their sense of academic achievement and continuance intention. Conversely, students who are less familiar with AI technology may rely more on traditional learning tools due to their lack of trust and understanding of AI's operations and potential (Zawacki-Richter et al., 2019). Based on the above introduction, this study proposes the following two research questions:

1. Can ChatGPT effectively motivate high school students to consistently use it for supplementary learning?
2. Can an understanding of AI impact how often high school students use ChatGPT?

2. Literature Review and Hypothesis

The motivation for achievement is a key driving force for success. Research shows a positive link between achievement motivation and academic success, as it encourages individuals to strive toward their goals and demonstrate competence. For example, studies have shown that achievement motivation influences the relationship between learning strategies and academic performance, highlighting its role in guiding academic behavior (Amabile, 1997; Bakhtiarvand et al., 2011). High school students with achievement motivation are more likely to continue using ChatGPT to enhance academic success.

Hypothesis 1: Achievement motivation will positively influence high school students' intention to continue using ChatGPT when assisting with course learning.

Challenge motivation is an intrinsic motivation that refers to the desire to seek complex and difficult tasks. In educational contexts, overcoming challenges can enhance self-efficacy, and perseverance, and bring about a sense of well-being (Fulmer & Frijters, 2011; Deci & Ryan, 1985; Lai et al., 2018). When students successfully overcome academic challenges, it strengthens their motivation and encourages them to continue using effective learning tools like ChatGPT. This suggests that challenge motivation positively influences students' intention to continue using ChatGPT for learning.

Hypothesis 2: Encouraging motivation plays a key role in shaping high school students' determination to persist in using ChatGPT as a tool for academic support.

AI literacy is defined as the ability of students to acquire and use AI-related knowledge and skills in their lives (Dai et al., 2020). The research by Kong et al. (2021) found that AI literacy can effectively enhance learners' understanding of AI concepts and improve their self-efficacy and course satisfaction. Alshehri (2017) pointed out that past experiences and cognition can influence students' course satisfaction and sense of achievement. The higher the students' satisfaction with the course, the higher their sense of achievement. On the other hand, AI literacy can boost students' confidence and satisfaction when learning AI-related knowledge and skills, thereby enhancing their learning motivation (Chen et al., 2024). Therefore, we hypothesize that when students have higher AI literacy, achievement motivation will have a stronger effect on their intention to continue using ChatGPT. This is because AI literacy makes them more confident in using ChatGPT to achieve academic goals, thereby enhancing their sense of achievement and willingness to continue using it.

Hypothesis 3a: AI literacy will strengthen the impact of achievement motivation on the intention to continue using ChatGPT.

AI literacy not only improves students' understanding of AI technology but also enhances their confidence and ability to cope with challenges. The study by Chai et al. (2021) showed that AI literacy and factors such as self-efficacy can directly or indirectly influence students' behavioral intentions to learn AI. Previous research has also shown that AI literacy is a key determinant of the intention to learn AI (Chai et al., 2020). When students have higher AI literacy, they are better equipped to deal with the challenges posed by AI technology, and they have greater confidence when facing difficult tasks (Chen et al., 2024). Therefore, we hypothesize that when students possess higher AI literacy, challenge motivation will have a stronger impact on their intention to continue using ChatGPT, as AI literacy enhances students' confidence and ability to tackle difficult tasks, thereby strengthening their motivation to overcome challenges and continue using the tool.

Hypothesis 3b: AI literacy will strengthen the impact of challenge motivation on the intention to continue using ChatGPT.

3. Research Methods

3.1 Research architecture

Based on the inferences drawn from the aforementioned research hypotheses, this study proposes the following research framework. The variables include challenge motivation, achievement motivation, AI literacy, and the intention to continue using. The research framework is illustrated in Figure 1.

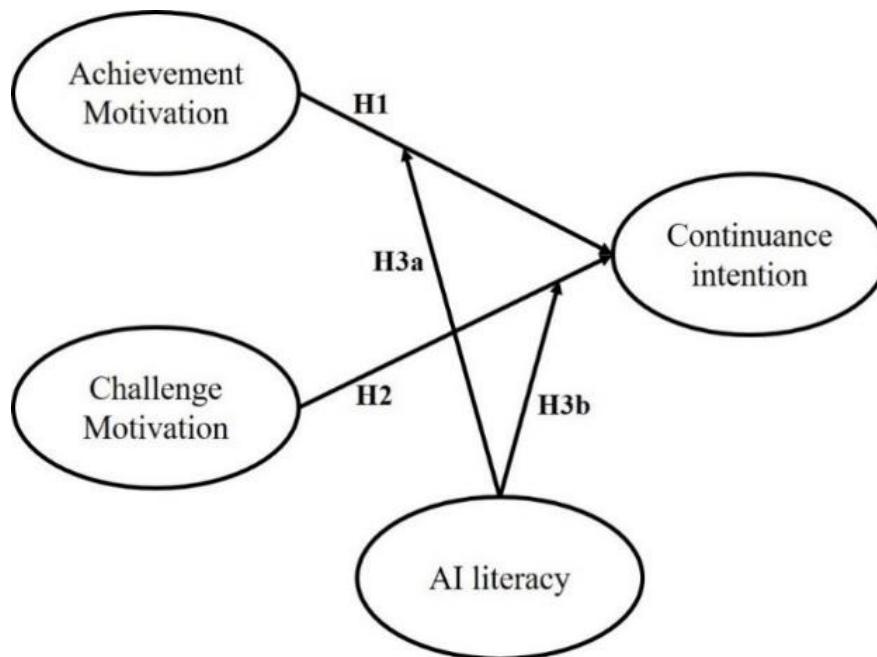


Figure 1. Research model

3.2 Questionnaire design

The design of the questionnaire items in this study is primarily based on previous literature, focusing on four main concepts: AI literacy, challenge motivation, achievement motivation, and intention to continue using. Specifically, the items for challenge motivation are derived from the work of Amabile et al. (1994) and Lai et al. (2018), consisting of a total of 5 items. The items for achievement motivation are taken from the study by Ghazali et al. (2019) and include 4 items. The AI literacy items are adapted from Chen et al.'s (2024) research, which explored university students' participation in AI software courses, and consist of 6 items. The items for the intention to continue using are modified based on the study by Bai, Wang, and Chai et al. (2021), with a total of 3 items. All the above scales are measured using a 5-point Likert scale.

To avoid measurement bias during the initial questionnaire design, this study first had the items translated into Chinese by three university professors. Subsequently, a professionally trained English-speaking individual helped translate the items back into English to ensure that the research concepts remained accurate. Finally, the questionnaire was distributed to students in the 11th and 12th grades at a high school in Kaohsiung, Taiwan.

4. Expected Research Result

This study anticipates that high school students' achievement motivation and challenge motivation will significantly positively influence their intention to continue using ChatGPT for learning assistance. Specifically, students who are driven by a strong desire to achieve academic success (achievement motivation) are more likely to find ChatGPT useful and continue utilizing it as a learning tool. Similarly, students motivated by challenges (challenge motivation) will perceive ChatGPT as an effective tool to overcome academic difficulties, further reinforcing their intention to use it.

Moreover, AI literacy is expected to play a critical moderating role in this relationship. Students with higher AI literacy are likely to experience a stronger positive impact of both achievement motivation and challenge motivation on their continuance intention. This is because AI-literate students may have a better understanding of how to maximize the benefits of ChatGPT, thus enhancing their sense of achievement and ability to tackle academic challenges.

We anticipate conducting the survey after October 2024, when high school students have returned to school. To enhance the validity of data collection, we plan to collaborate with class teachers, who will assist in distributing the questionnaires uniformly across classes. This coordinated effort will help ensure a more systematic and reasonable collection of responses.

Through these findings, the research is expected to highlight the importance of fostering both intrinsic motivation and AI literacy among high school students to encourage the continued use of advanced AI tools like ChatGPT. The study will also provide valuable insights into integrating AI technology into educational settings, ultimately enhancing students' learning experiences and outcomes.

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