



**THE FACTORS INFLUENCING ONLINE LEARNING
ENGAGEMENT BASED ON DEEP LEARNING THEORY**

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**AN INDEPENDENT STUDY SUBMITTED IN PARTIAL
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This Independent Study has been Approved as a Partial Fulfillment of the
Requirements for the Degree of Master of Business Administration


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ABSTRACT

Online learning has become popular among many learners due to its autonomy, convenience, and wealth of resources. College students are the primary group engaged in online learning. The effectiveness of online learning is directly related to how well learners grasp course material. Among the key factors affecting learning outcomes, student engagement has received significant attention from researchers. This study aimed to achieve the following objectives: 1) To examine the effect of self - efficacy on online learning engagement; 2) To examine the effect of teaching interaction on online learning engagement and 3) To examine the effect of online learning platform on online learning engagement.

To gain a deeper understanding of these factors, this study used a quantitative research approach. A questionnaire specifically designed to assess online learning engagement was developed and distributed to engineering students of Guangxi University of Information. The research found that self-efficacy, teaching interaction and online teaching platform have a significant positive effect on online learning engagement.

Therefore, in online learning, teachers can set differentiated goals based on students' abilities, and reasonably assign group members during collaborative learning according to students' learning abilities and gender. In regular teaching practices, teachers can also use verbal reminders and emotional encouragement to motivate students. From the perspective of partnering enterprises, it is important to guide and train teachers in the operation and use of technological equipment, while paying

attention to their practical needs. From the school's perspective, optimizing the evaluation and assessment system can motivate teachers to participate in relevant training.

Keywords: online learning engagement, self - efficacy, teaching interaction, online learning platform, influencing factors



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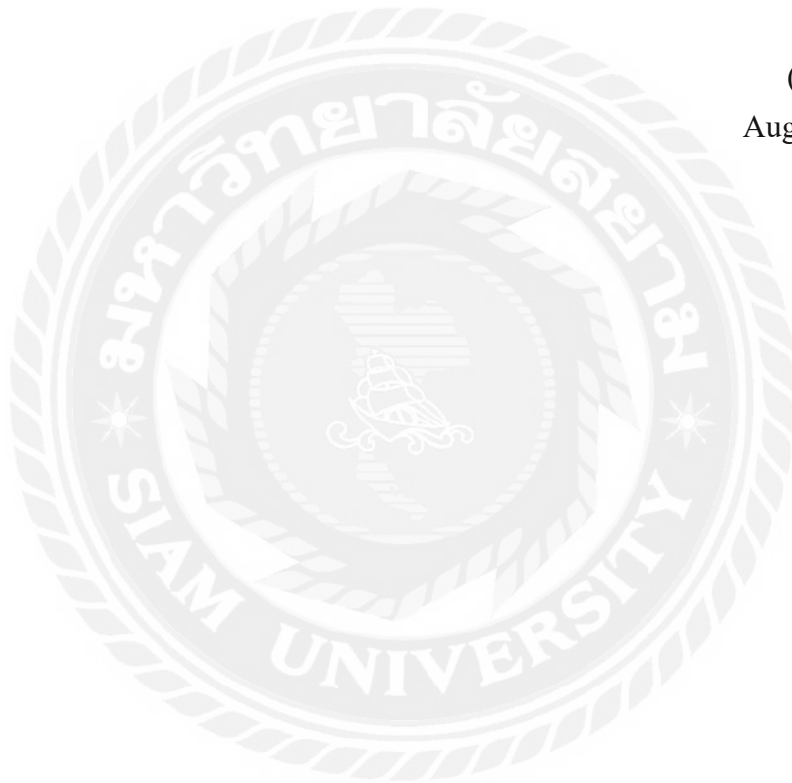
Finally, I want to thank my friends. Your understanding, support, and encouragement have given me the warmth of a family. I will always cherish the wonderful times we've shared and hold them close to my heart.

LI WENJING

DECLARATION

I, LI WENJING, hereby certify that the work embodied in this independent study entitled “The Factors Influencing Online Learning Engagement Based on Deep Learning Theory” is result of original research and has not been submitted for a higher degree to any other university or institution.

(Li Wenjing)
August 1, 2024



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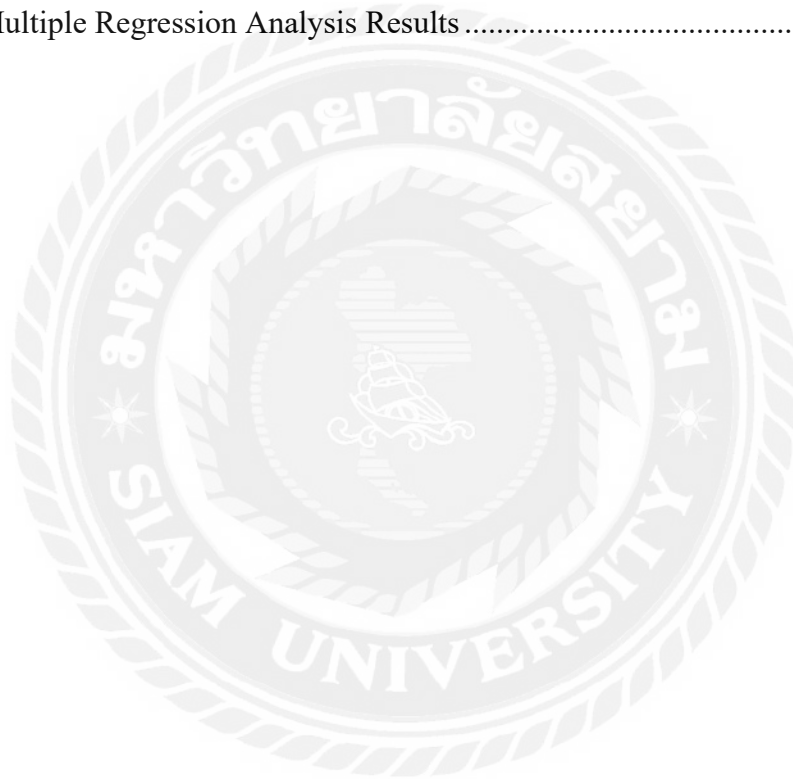
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Chapter 1 Introduction

1.1 Background of the Study

The rapid advancements in new information technologies have improved the educational environment, making educational informatization a mainstream trend in current educational development. As a crucial component of "Internet + Education," online courses are an important means of innovating higher education. They have already achieved significant success in both domestic and international contexts at this stage (Jin et al., 2018).

In 2008, Massive Open Online Courses (MOOCs) emerged as a mainstream form of online education, causing a significant impact in the field of higher education (Ren et al., 2015). Well-known MOOC platforms such as Coursera, edX, and Udacity were established, with prestigious institutions like Harvard University and the Massachusetts Institute of Technology joining the movement (Wu & Li, 2015). This development has had a profound influence on higher education abroad, it has had a significant impact on higher education abroad.

In China, the National Outline for Medium and Long-term Education Reform and Development (2010-2020) emphasized the acceleration of educational informatization infrastructure construction. It highlighted the importance of fully utilizing modern teaching methods, enhancing the ability to use information technology, and promoting the development and popularization of information technology (Ministry of Education, 2010). In 2020, the COVID-19 pandemic swept across the country, greatly impacting the teaching activities of universities nationwide. The Ministry of Education issued the Guidelines on Organizing and Managing Online Teaching in Higher Education Institutions During the Pandemic Prevention and Control Period, which stated that universities must fully utilize online teaching as a channel to actively conduct online educational activities. In March 2023, the China Internet Network Information Center released the 51st Statistical Report on the Development of the Internet in China. The report showed that as of December 2022, the number of internet users in China reached 1.067 billion, an increase of 35.49 million compared to December 2021. Among these, the number of online education users reached 325 million (CNNIC, 2023). The country has been actively promoting the development of educational informatization, leveraging technology to empower education. Online education has gradually come to

stand alongside traditional education and has quickly gained popularity and spread in the current learning environment, becoming one of the mainstream methods of learning.

Online learning has become popular among many learners due to its autonomy, convenience, and wealth of resources. College students are the primary group engaged in online learning. The effectiveness of online learning is directly related to how well learners grasp course material. Among the key factors affecting learning outcomes, student engagement has received significant attention from researchers (Li & Yu, 2015).

In the information age, an overwhelming amount of fragmented information surrounds us, requiring learners to engage in deep processing of knowledge. Surface learning is far from sufficient, giving rise to the concept of deep learning. Currently, deep learning is advocated in both the field of artificial intelligence and psychology (Gu, 2015). Since the introduction of the new curriculum reform, deep learning has moved from a theoretical concept into schools, becoming a "beacon for 21st-century school transformation." Many scholars believe that deep learning can promote the development of essential character traits and key abilities that Chinese students need for the future society.

1.2 Problems of the Study

The National Outline for Medium and Long-term Education Reform and Development (2010-2020) clearly states that the fundamental purpose of educators is to prioritize student development. It emphasizes fully leveraging students' initiative, respecting educational principles and the laws of students' physical and mental development, and promoting the active and vibrant growth of each student (Ministry of Education, 2010).

Online courses, with their characteristics of openness and sharing, have become a mainstream trend in higher education course models. While they bring convenience to teaching, they also lead to shallow learning phenomena, such as students dropping out of courses, abandoning their studies midway, not actively participating in class discussions, and failing to complete related tasks such as quizzes, assignments, and exams on time (Zhou & Lu, 2023). Behind these shallow learning phenomena are various contributing factors. Therefore, this study explores depth learning theories and key factors affecting student engagement to address the following research questions:

1) Does self - efficacy have a significant positive effect on students' online learning engagement ?

2) Does teaching interaction have a significant positive effect on students' online learning engagement?

3) Does online learning platform have a significant positive effect on students' online learning engagement ?

1.3 Objectives of the Study

In an online learning environment, rich and concentrated interactions among learners can facilitate collaboration among group members. However, in terms of actual collaborative learning quality and outcomes, the results may not be ideal. Engagement is a primary focus in online learning research and plays a crucial role in improving the quality of online education. When online learners demonstrate higher levels of engagement, their critical thinking and learning performance tend to be better as well (Hu & Dong, 2017).

Therefore, it is necessary to explore the factors affecting engagement in online learning. This study aims to achieve the following objectives:

1) To examine the effect of self - efficacy on online learning engagement.

2) To examine the effect of teaching interaction on online learning engagement.

3) To examine the effect of online learning platform on online learning engagement.

1.4 Scope of the Study

This study explores the primary factors influencing online learning engagement. By reviewing previous research, it was concluded that self-efficacy, teaching

interaction, and online learning platforms significantly affect students' levels of engagement in online learning.

To gain a deeper understanding of these factors, this study employed a quantitative research approach. A questionnaire specifically designed to assess online learning engagement was developed and distributed to engineering students of Guangxi University of Information. By collecting a substantial amount of quantitative data, the study systematically analyzed how self-efficacy, teaching interaction, and online learning platforms influence students' online learning engagement. The aim of this research is to provide a scientific basis for optimizing online learning environments and to offer practical recommendations for improving educational practices.

1.5 Significance of the Study

1.5.1 Theoretical Significance

This study can help better understand the factors influencing engagement in online learning from the perspectives of deep learning theory and engagement theory. It aims to further optimize the online course teaching model by creating personalized teaching plans based on students' interests, abilities, and learning styles. By doing so, students can perceive the practicality and enjoyment of online learning. Teachers can design engaging teaching activities, use multimedia teaching tools, and introduce gamified learning, all while considering students' emotional needs. This approach seeks to create a learning environment that stimulates students' interest and increases their engagement. At the same time, this study contributes to the research on factors affecting engagement, providing valuable references for future related studies.

1.5.2 Practical Significance

By exploring the state of engagement in online learning, this study provides empirical references for efficient learning in online classrooms. More importantly, it helps to understand the current state of online learning engagement and identify existing issues, offering new perspectives for improving online teaching effectiveness. Analyzing the factors affecting engagement can guide teachers in designing and delivering online courses, helping them understand which factors are likely to influence student engagement. This knowledge allows educators to avoid negative influences and effectively enhance the quality of online teaching.

Chapter 2 Literature Review

2.1 Introduction

This chapter provides a systematic review and analysis of the relevant literature. Firstly, the study focuses on the theory of deep learning. The deep learning theory emphasizes learners' understanding and internalization of knowledge, highlighting the development of students' critical thinking and innovation skills.

Secondly, the study analyzes key factors influencing online learning engagement, including behavior, cognition, and emotion engagement. This study provides a rich theoretical foundation and background support for subsequent research, contributing to a deeper understanding of the mechanisms of learning engagement in online learning environments.

2.2 Theoretical Foundation

2.2.1 Deep Learning Theory

Deep learning was initially proposed in the field of artificial intelligence, but its meaning differs significantly from the concept of deep learning in education. In the educational context, the term "deep learning" was first introduced by Professors Marton and Säljö. In their research, deep learning refers to the process through which students acquire knowledge and process information (Marton & Säljö, 1976). Building on this foundation, Professor Biggs further refined the concept, defining deep learning as an active construction of knowledge by the learner, characterized by deep emotional engagement and strategic cognitive processes (Biggs, 2007). As the theory developed, deep learning has been defined as a key competency for learner development. It refers to the ability of students to draw on prior experiences to solve problems in new and varied situations.

Some researchers in China defined deep learning as the process in which learners critically engaged with new knowledge, interacted with existing knowledge, and formed new cognitive structures, thereby achieving knowledge transfer and application (Li & He, 2021). As a learning approach, deep learning emphasized the behaviors and external characteristics displayed by learners during the learning process. However, this perspective tended to overlook the emotional attitudes and values of students in the

learning process, treating deep learning more as a tool than as a holistic educational experience (Gu, 2015).

The William and Flora Hewlett Foundation, in implementing the SDL (Student-Driven Learning) project, defined deep learning as the essential skills students need to be competent in 21st-century work and civic life. It aims to enable students to apply the knowledge they have acquired flexibly in real-world situations (Duan & Yu, 2018). The ultimate goal of deep learning is to apply learned knowledge to solve complex problems in authentic contexts. By focusing on learning outcomes, this definition of deep learning overcomes the narrow view of formal cognitive changes and emphasizes the multidimensional aspects of learners' psychological and cognitive changes during the learning process (Hu & Dong, 2017).

Deep learning should encompass the following processes (Chen, 2018):

First, deep learning involves active learning under the premise of teacher-led instruction and student-centered participation. This is facilitated by creating engaging contexts and problem scenarios to enhance students' initiative and enthusiasm.

Second, deep learning requires students to critically understand fragmented knowledge points and actively construct a knowledge system, integrating new and existing knowledge.

Third, deep learning demands that students grasp the essential nature of knowledge as well as scientific thinking and methods. Achieving this requires students to fully engage in thoughtful consideration, deeply process and organically integrate knowledge, and progress from lower-order to higher-order thinking.

Fourth, deep learning expects students to apply the knowledge they have learned to solve real-world problems, achieving the transfer and application of knowledge and realizing the ultimate goal of bridging the gap between theoretical knowledge and practical life.

This approach focuses on the development of core competencies and aligns with the requirements for students' personal growth and the cultivation of national talent.

In this study, students engaged in deep learning through online education, utilizing various resources with sustained focus and high levels of commitment. This self-directed learning environment facilitated the flexible application of multiple learning strategies. As students mastered and understood new knowledge, they not only gained a deep comprehension of the content but also connected it with their existing knowledge, enabling knowledge transfer and innovation.

2.3 Online Learning

The concept of online learning was first introduced by Hiltz in 1994, who defined it as the practice of placing course materials on a web page to create a virtual learning space, achieving the effects of face-to-face learning. Some scholars have described online learning as networked learning, which involves establishing educational platforms on the internet. In this mode, learners use the web to access educational resources, and it relies on multimedia network resources, virtual communities, and technological platforms to create a new online learning environment (Zhong, 2002). According to He, online learning involves learners using computer networks to access educational resources and tools for web-based courses. This method leverages multimedia technology, computer technology, and network technology to process learning resources, providing a learning and teaching environment that overcomes limitations of time, space, and location for both learners and educators (He & Li, 2009).

MOOCs (Massive Open Online Courses) have rapidly emerged globally, meeting the demands of the information age for education. They have broken the constraints of time and space, addressed educational equity to some extent, and expanded the scale of learning (Xu, 2021). MOOCs enable free sharing of educational resources and cater to learners' needs for autonomous, collaborative, and interactive learning. The emergence of online learning has challenged the status of traditional classroom education. With its unique advantages, online learning represents a significant transformation for conventional classroom-based instruction.

2.4 Learning Engagement

The concept of learning engagement has gradually entered the research field alongside work engagement. Researchers initially used learning engagement to describe a continuous, positively emotional state of learners (Wang et al., 2022).

In the 1930s, Tyler pioneered the concept of "Task time," indicating that the more time workers dedicate to their tasks, the greater their rewards. Schaufeli and colleagues (2002) proposed that learning engagement is the mental state learners exhibit during the learning process, encompassing three dimensions: vigor, dedication, and absorption. Vigor refers to the abundant energy and strong perseverance displayed throughout the learning process, allowing learners to immerse themselves in learning without external distractions. Dedication means that learners can focus on online learning and feel a sense of satisfaction and value after learning. Absorption refers to the state of maintaining concentration during learning, experiencing both physical and mental pleasure, and perceiving time as flying by during the learning process.

With the development of educational informatization, learning methods are gradually shifting from traditional to online learning. Due to the differences in learning contexts and methods between traditional and online classrooms, engagement in online learning may change. However, at its core, both types of learning reflect the level of learner engagement in their academic processes.

Liang (2018) explored the relationship between learning engagement and self-efficacy based on a social cognitive theory framework, finding a significant positive correlation between the two. Zhang et al. (2019) identified self-efficacy, cognitive load, and technology acceptance as personal factors influencing students' learning engagement. Additionally, improper use of tablets was found to hinder elementary students' engagement, with boys exhibiting higher frequencies of negative and non-engagement behaviors compared to girls in this context.

Wang (2020) concluded that individual student characteristics, teacher support, and online learning platforms all have a significant impact on online learning engagement. Fredricks et al. (2004), after analyzing survey data from 306 university students, found that learning self-efficacy and perceived usefulness of the learning platform directly impact learning engagement. Xia and Yuan (2020), through analysis

of learning behavior data from 152 students, discovered that teacher feedback and peer interaction have a significant effect on learning engagement.

In summary, scholars have mainly discussed the factors influencing learning engagement from aspects such as self-efficacy, teaching interaction, and the online learning platform. Therefore, this study will also explore the impact of these factors on students' learning engagement.

2.4.1 Self - Efficacy

Self-efficacy is one of the key factors affecting engagement in learning. Self-efficacy refers to an individual's subjective judgment of their ability to solve problems in a particular environment (Jia et al., 2020). When self-efficacy is applied to learning and academic contexts, it is referred to as academic self-efficacy. This concept involves how individuals assess their own abilities in learning and academic achievement, as well as how this belief affects their learning performance and success.

Self-efficacy is crucial in learning because academic self-efficacy can directly influence students' engagement in their studies. It also affects their motivation, attitudes, and academic performance (Chen & Xie , 2021). Strong positive feelings and satisfaction with learning can enhance students' confidence and affirmation of their learning abilities. This, in turn, boosts their confidence in addressing academic challenges and increases their engagement in learning through improved academic self-efficacy (Chen & Wang, 2023).

Sun (2023) noted that students with high academic self-efficacy are more motivated to take on challenges and are more willing to tackle difficult tasks. This fosters their drive for success and competitiveness, which enhances their engagement in learning. This mindset helps students to focus better and fully immerse themselves in their studies. Zhang et al. (2017) found a significant positive correlation between students' focus in the learning domain and their self-efficacy. Jia et al. (2020) indicated that individuals with higher academic self-efficacy typically display greater confidence in their learning, making them more willing to actively participate in classroom activities and thereby increasing their level of engagement in learning.

2.4.2 Teaching Interaction

Education is a social activity, with interaction serving as the foundation of educational activities. Interaction is a process of mutual influence. In the early research on online learning, instructional interaction was often used to refer to certain educational phenomena (Gu, 1998). As online learning continued to evolve, scholars began to define the concept of instructional interaction more clearly. Dewey described instructional interaction as the process through which students and their learning environment interact and establish connections (Chen & Ye, 2021). Wagner (1994) defined instructional interaction as a process of interaction between two or more entities and actions. Wambach and Thurmond (2004) defined instructional interaction in online learning as the process of interaction between learners and instructors, learning content, peers, and platform interfaces.

The dimensions of instructional interaction are generally categorized into the following types: (1) Focusing solely on communication between individuals. For example, Wagner divides instructional interaction into two aspects: learner-learner interaction and student-teacher interaction. (2) Considering the interaction between learners and instructional elements in a traditional classroom environment. For instance, Moore classifies instructional interaction into three categories: learner-learner interaction, learner-instructor interaction, and learner-content interaction. In this study, instructional interaction is divided into two dimensions: learner-instructor interaction and learner-learner interaction.

Student-teacher interaction involves the behavioral exchanges between teachers and students. Teacher behaviors toward students include praising, empathizing, asking questions, explaining, giving instructions, and maintaining authority (Moore, 1993). Student behaviors toward teachers include responsive actions and proactive actions. Additionally, this interaction also encompasses special behaviors such as silence and disorder.

Liu et al. (2017) found that learner-instructor interaction can stimulate students' intrinsic motivation, creating a supportive learning environment that enhances student engagement. Zheng et al. (2021) conducted a qualitative study involving 15 undergraduate students to investigate and further understand the factors influencing student engagement at K University's College of Education. The study revealed that learner-instructor interaction plays a crucial role in establishing classroom reliability

and fostering a learning atmosphere, which, in turn, affects student engagement to some extent.

Empirical research has shown that learner-instructor interaction can directly or indirectly impact learners' emotional engagement, thereby positively influencing their proactive learning. In summary, students' perception of teachers' attention and encouragement can effectively increase emotional engagement in online learning; diverse forms of learner-instructor interaction can spark students' interest in learning and reduce negative behaviors; and timely responses and feedback from teachers can enhance students' cognitive engagement in online settings.

Peer interaction refers to the communication and interaction between learners, typically occurring in study groups, classroom discussions, or collaborative projects. Peer interaction involves not only the exchange of information and knowledge but also the sharing of perspectives, discussion of problems, and mutual support and feedback (Zhang et al., 2020). Through peer interaction, learners can collaboratively construct knowledge, enhance understanding, boost learning motivation, and develop critical thinking and collaboration skills.

Kasperski et al. (2020) Found that peer interaction on social media can strengthen interpersonal relationships, improve classroom atmosphere, and thereby increase learners' active engagement in learning activities. Lu et al. (2019) used content analysis, descriptive statistics, and other methods to analyze the learning activities of undergraduate students in a social network environment. Their study revealed that peer interaction can influence learners' intrinsic motivation, which in turn affects the engagement of online learners. Thus, it is evident that communication and interaction between students and other learners can reduce the negative emotions caused by online social isolation, thereby enhancing emotional engagement. Collaborative learning, where students adjust their learning behavior and progress, can promote behavioral engagement. Additionally, resolving disagreements through the sharing of perspectives can enhance cognitive engagement.

2.4.3 Online Learning Platform

An online teaching platform refers to a software system built on the foundation of modern educational and information technologies, designed to provide comprehensive

support for online teaching. It serves as an integrated support platform for all aspects of teaching, including courseware creation, online lesson preparation, network-based instruction, development of online course resources, online assignments, online communication, online exams, and teaching quality assessment. Similar to traditional classrooms, students can log into the platform, browse course resources, participate in learning activities, complete assignments given by teachers, and interact with classmates and instructors. This facilitates the transformation of cognitive, behavioral, and emotional aspects of learning.

Rao et al. (2020) analyzed survey data from 5,789 university students and found that the overall level of online learning engagement among current college students is relatively low, with the experience of using online learning platforms directly affecting their engagement levels. Based on this, strategies for improving online learning engagement were proposed from the perspectives of technical support, teacher support, and learning resource design. Wang (2013) conducted a survey analysis of over 60,000 university students nationwide and found that the choice of learning platform has a significant positive impact on the level of engagement among online learners.

2.5 Conceptual Framework

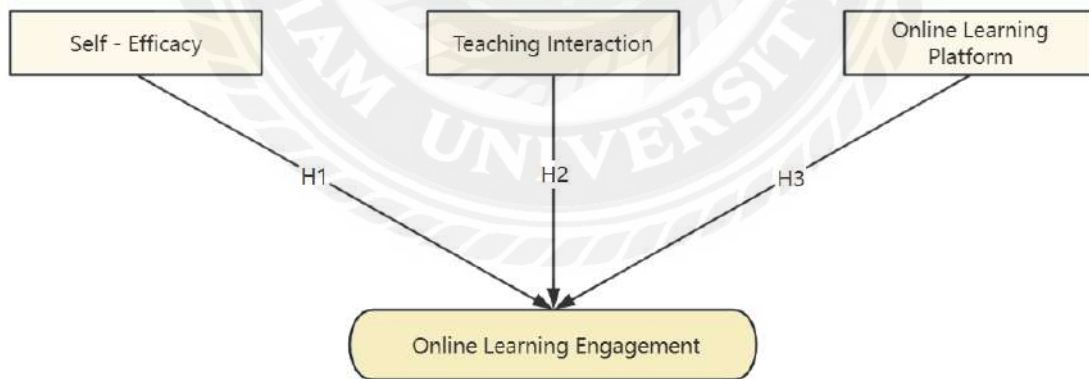


Figure 2.1 Conceptual Framework

Chapter 3 Research Methodology

This study used a quantitative approach, and data were collected through a questionnaire survey, which aimed to understand the current level of student engagement in online learning and to determine whether various influencing factors are related to engagement. Based on these findings, strategies for enhancing online learning engagement were proposed. The study utilized SPSS statistical software to assess the reliability and validity of the scales.

3.1 Research Design

This study, based on the factors influencing online learning engagement and combined with the deep learning theory, ultimately identifies self-efficacy, teaching interaction, and online learning platforms as the three key components of online learning engagement. Based on these factors, this study used a quantitative approach, and an Online Learning Engagement Scale was developed, which consists of five sections. The scale uses a Likert 5-point scale for measurement and includes five levels, ranging from "Strongly Disagree" to "Strongly Agree," and is used to assess respondents' level of agreement with each statement.

Section 1: Demographic information

The personal information section primarily surveys students' grade levels, gender, and duration of online learning. This information aims to provide the basic context of students' online learning experiences and provides a foundation for subsequent research.

Section 2: Self-efficacy Scale

Self-efficacy is an important factor influencing learner engagement in online learning. Self-efficacy refers to a learner's confidence and ability to successfully complete online learning tasks. It largely determines the level of engagement a learner will invest in their online learning, as well as their persistence and resilience when faced with challenges. Therefore, self-efficacy can be seen as the concrete manifestation of a learner's confidence and a critical driving force in the online learning process. The scale consists of 8 questions. See Table 3.1.

Table 3.1 Self-efficacy Scale

Self-efficacy Scale
1. I believe I can effectively solve difficulties and challenges encountered during the learning.
2. I believe I can proactively seek out and utilize additional learning resources to enhance my learning outcomes.
3. I believe I can persist in completing all assignments and projects in the online course, even when facing difficulties.
4. I believe I can understand and apply complex concepts and knowledge points in the online course.
5. I believe I can manage my time effectively for online learning and maintain my study progress.
6. I believe I can collaborate and communicate effectively with classmates in the online course.
7. I believe I can utilize the tools and features of the online learning platform to optimize my learning experience.
8. I believe I can seek help when needed and continuously improve my learning strategies based on feedback.

Section 3: Teaching Interaction Scale

Based on the characteristics of the time-space separation in online learning, teaching interaction is considered an essential component influencing online learning engagement. Teaching interaction is categorized into teacher-student interaction and student interaction. Therefore, the teaching interaction questionnaire in this study is divided into two dimensions: teacher-student interaction and student interaction, with a total of 12 questions, each dimension, teacher-student interaction and student-student interaction, consists of 6 questions. See Table 3.2.

Table 3.2 Teaching Interaction Scale

Teaching Interaction Scale
9. In the online course, the teacher regularly poses questions for us to discuss in the forum.
10. The teacher responds to my questions promptly.
11. I have replied to the instructor's messages and questions.
12. The teacher provides additional learning resources through the course platform encourages us to ask questions related to these resources for discussion.

13. After the course ends, the teacher organizes online office hours to address our questions and discuss our progress.
14. I frequently receive personalized feedback from the teacher on my assignments and discussion posts, which makes me feel supported and valued.
15. Overall, I have had a lot of interaction with other learners in the online course regarding the course content.
16. I have received valuable feedback from other learners in the online course.
17. I communicate with other learners about the course content through various methods such as offline discussions, QQ, WeChat, and discussion forums.
18. I respond to classmates' questions in different ways, such as through discussion posts or email.
19. I share my thoughts and applications of the course content with other classmates.
20. I provide feedback on other classmates' ideas and perspectives.

Section 4: Online Learning Platforms Scale

As the primary venue for student learning, online learning platforms play a crucial role in influencing learning engagement. Platforms can enhance support and assurance for students by optimizing their features and services, such as virtual classrooms and interactive tools. High-quality platform features and services act as catalysts and equalizers in promoting online learning, enhancing learners' motivation and engagement. The more comprehensive the support provided by the online learning platform, the higher the level of learner engagement. See Table 3.3.

Table 3.3 Online Learning Platform Scale

Online Learning Platforms Scale
21. The platform provides sufficient virtual classrooms and meeting functions to support real-time interaction and discussion.
22. The platform has a comprehensive learning resource library, including course materials, video lectures, and relevant documents, which meets my learning needs.
23. The platform is equipped with effective online assessment tools that can promptly track and provide feedback on students' progress and grades.
24. The platform offers various interactive tools, such as discussion forums, instant messaging, and Q&A features.
25. The platform has a user-friendly interface and navigation features, allowing me to easily access course content and manage my learning effectively.

Section 5: Online Learning Engagement Scale

The online learning engagement scale used in this study is adapted from Li (2016) "College Students' Online Learning Engagement Scale." The scale consists of 10 items. See Table 3.4.

Table 3.4 Online Learning Engagement Scale

Online Learning Engagement Scale
26. I attend each online learning session on time.
27. During the online learning process, I carefully take notes on important points discussed by the instructor in class.
28. I am able to complete various learning activities set by the instructor in online learning (such as tests, assignments, and forums) and achieve good results.
29. I diligently study the various learning resources provided in the online course.
30. Before starting online learning, I create an appropriate study plan for myself.
31. During the online learning process, I use learning strategies and methods to understand and master important concepts.
32. I frequently analyze, summarize, and integrate online learning resources with previous knowledge and experience.
33. I enjoy learning through the online learning platform.
34. I am very interested in the content of online learning.
35. When completing learning tasks in online learning, I experience a sense of satisfaction and achievement.

3.2 Hypothesis

Ha: Self - efficacy has a significant positive effect on online learning engagement.

Hb: Teaching interaction has a significant positive effect on online learning engagement.

Hc: Online learning platform has a significant positive effect on online learning engagement

3.3 Sample and Data Collection

This study aims to identify the factors influencing student engagement in online learning environments and provide actionable recommendations for online learning

platform managers and instructional administrators. The study targeted 372 engineering students from Guangxi University of Information who had participated in online courses on "Java Programming" and "Computer Networks and Information Security." Using the Questionnaire Star platform, an online survey was distributed over the course of one week. A total of 372 responses were collected, of which 348 were valid, resulting in a response rate of 93.5%.

3.4 Data Analysis

After data collection was completed, the questionnaire data were analyzed using SPSS for descriptive statistics, reliability analysis, validity analysis, correlation analysis, and multiple regression analysis. The results of these analyses help us understand the relationship between online learning engagement and various influencing factors.

3.5 Reliability and Validity Analysis

This study uses Cronbach's alpha coefficient to measure the internal reliability of the questionnaire. A higher Cronbach's alpha indicates greater internal consistency of the questionnaire. The internal consistency of the questionnaire is assessed by examining the reliability of each section of the scale.

Table 3.5 Reliability Test Results

Scale	Cronbach's Alpha
Self-efficacy	0.86
Teaching interaction	0.78
Online learning platform	0.82
Online Learning engagement	0.87

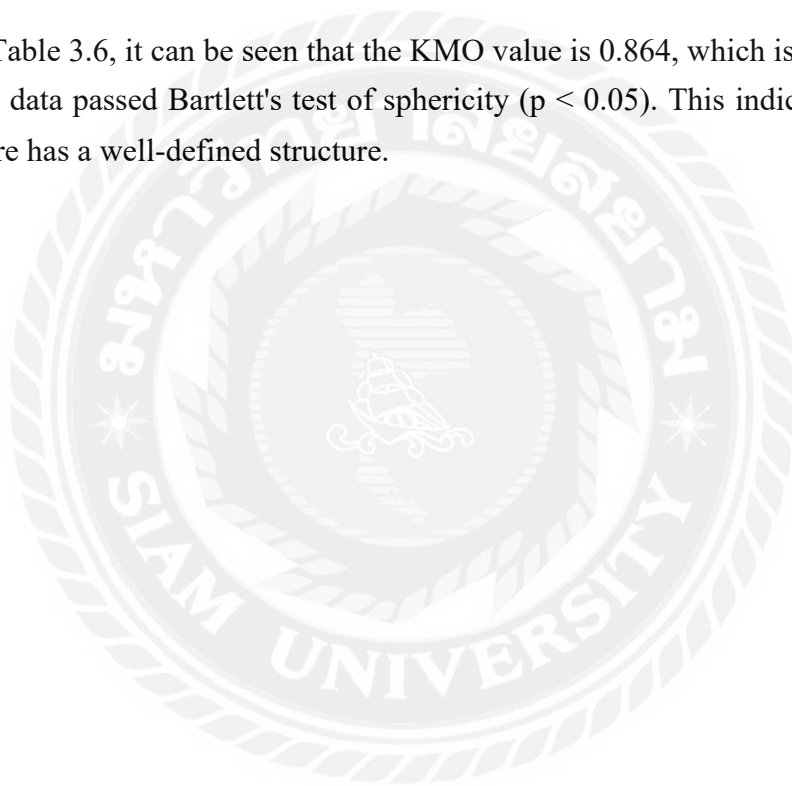
As shown in Table 3.5, the Cronbach's alpha coefficients for self-efficacy, teaching Interaction, online learning platform, and learning engagement in the study are 0.86, 0.78, 0.82, and 0.87, respectively. All values are greater than 0.7, indicating good internal consistency and high reliability of the scale. Therefore, the data can be used for further analysis, demonstrating that the questionnaire in this study has strong reliability.

The validity of the questionnaire needs to meet two conditions: first, the KMO value must be greater than 0.6; second, the significance of Bartlett's test of sphericity must be less than 0.05.

Table 3.6 Validity Test Results

KMO and Bartlett's tests		
KMO value		0.864
Bartlett's test of sphericity	Approximate chi-square	1782.31
	df	217
	Sig.	0.000

From Table 3.6, it can be seen that the KMO value is 0.864, which is greater than 0.6, and the data passed Bartlett's test of sphericity ($p < 0.05$). This indicates that the questionnaire has a well-defined structure.



Chapter 4 Findings

4.1 Descriptive Statistics

Before analyzing the core variables of the study, it is important to conduct a descriptive statistical analysis on the demographic data of the sample, including gender, grade levels, and duration of online learning.

Table 4.1 Demographic Characteristics of Sample

Demographic	Category	Frequency	Percentage
Gender	Boy	197	56.6%
	Girl	151	43.4%
Grade levels	Grade 1	76	21.8%
	Grade 2	91	26.1%
	Grade 3	87	25.0%
	Grade 4	94	27.1%
Duration of online learning	Less than 1 hour	49	14.1%
	1-3 hours	96	27.6%
	3-6 hours	149	42.8%
	More than 6 hours	54	15.5%

According to Table 4.1, among the 348 valid samples in this survey:

In terms of gender, there are 197 males, accounting for 56.5% of the total, and 151 females, accounting for 43.4%.

By grade level, there are 76 grade 1 students, representing 21.8% of the total; 91 grade 2 students, representing 26.1%; 87 grade 3 students, representing 25.0%; and 94 grade 4 students, representing 27.1%.

Additionally, the study also analyzed the duration of online learning among university students. The findings indicate that 49 students spend less than 1 hour, which constitutes 14.1% of the total; 96 students spend between 1 and 3 hours, accounting for 27.6%; 149 students spend between 3 and 6 hours, making up 42.8%; and 54 students spend more than 6 hours, representing 15.5% of the total.

4.2 Correlation Analysis

To better measure the degree of correlation between two random variables, the Pearson correlation coefficient is introduced. It is calculated by dividing the covariance of the two variables by the product of their standard deviations. Pearson's coefficient ranges from -1 to 1. When the linear relationship between two variables strengthens, the correlation coefficient approaches 1 or -1. If one variable increases as the other also increases, it indicates a positive correlation, with a correlation coefficient greater than 0. Conversely, if one variable increases while the other decreases, it indicates a negative correlation, with a correlation coefficient less than 0. A correlation coefficient of 0 suggests that there is no linear relationship between the variables.

Table 4.2 Correlation Analysis Results

Variable	Self-efficacy	Teaching Interaction	Online Learning Platform	Online Learning Engagement
Self-efficacy	1			
Teaching Interaction	0.638**	1		
Online Learning Platform	0.602**	0.565**	1	
Online Learning Engagement	0.553**	0.497**	0.584**	1

From Table 4.2, it can be seen that self-efficacy, teaching interaction, online learning platform are all significantly correlated with students' online learning engagement at the 0.01 level. This indicates that self-efficacy, teaching interaction, online learning platform have significant positive correlations with online learning engagement.

4.3 Multiple Regression Analysis

Regression analysis primarily examines how one variable is influenced by other variables. The dependent variable is the variable being affected, while the independent variables are the influencing factors. This analysis investigates the causal relationships between the dependent and independent variables. In this section, the study uses

multiple regression analysis to assess the predictive ability of various influencing factors on the dimensions of online learning engagement.

Table 4.3 Multiple Regression Analysis Results

	Non-Standardized Coefficient		Standardized coefficient	p-Value	VIF
	B	Standard Error	Beta		
(Constant)	0.154	0.076	-	0.108	-
Self-efficacy	0.317	0.082	0.314	0.002	4.681
Teaching interaction	0.421	0.067	0.426	0.013	4.177
Online learning platform	0.309	0.092	0.367	0.011	4.582
R ²	0.496				
Adjusting R ²	0.492				
F	82.731**				
DW	1.941				

From Table 4.3, it can be seen that the model's R-squared value is 0.492, which means that self-efficacy, teaching interaction, and online learning platform can explain 49.2% of the variance in online learning engagement.

To avoid multicollinearity issues, it is necessary to test the variance inflation factor (VIF) of the predictor variables. The VIF values in the model were found to be less than 5, indicating that there are no multicollinearity problems. To prevent autocorrelation between models, an autocorrelation test is conducted. The Durbin-Watson (D-W) value for the model is 1.941, which is less than 2, indicating that the model is well-specified.

From the regression coefficients in the Table 4.3, it can be observed that self-efficacy, teaching interaction, and online learning platform all have a significant positive impact on online learning engagement.

Chapter 5 Conclusion and Recommendation

5.1 Conclusion

Based on the deep learning theory and relevant literature, factors influencing online learning engagement were identified. Through empirical analysis, this study reached the following conclusions:

Self-efficacy has a significant positive affect on online learning engagement. Therefore, in online learning environments, learners should set realistic learning goals, employ various learning strategies to acquire and reconstruct knowledge, and enhance their cognitive abilities. Even when facing academic difficulties and challenges, learners should remain undaunted and engage more actively in online learning. Online classes need to enhance learner participation and foster a sense of belonging among students. When learners are involved in learning activities, educators should guide them effectively, closely monitor their progress, and offer praise and encouragement to help them experience the joy and sense of achievement from learning. Additionally, learners should seek academic help promptly if they encounter difficulties that they cannot resolve on their own. This will ensure they receive timely academic guidance, improve their learning methods and steps, and foster academic progress and development.

Teaching interaction has a significant positive affect on online learning engagement. Encouraging students to engage in heuristic and integrative learning across different subjects, reflecting and discussing connections between disciplines, can enhance the relevance between subjects and foster creative thinking. Online classes should implement collaborative and participatory learning methods, focusing on learner-centered, guided, and inquiry-based teaching, and support students in using group presentations as a learning format. In practice, online classes can leverage interactive teaching software to facilitate active classroom interactions, assist and affirm students' interaction processes and outcomes, and promote effective learning. Effective course interactions can enhance the efficiency of online teaching, help learners develop self-directed learning habits, cultivate innovative thinking, and encourage comprehensive learning habits.

Online learning platform has a significant positive affect on online learning engagement. To ensure the orderly conduct of online teaching, educational departments

need to establish a comprehensive support mechanism for hardware. Hardware support is a crucial foundation for the implementation of online teaching. Schools, as the primary learning environment for students, need to improve the hardware facilities in laboratories, teaching buildings, libraries, and other learning spaces. This includes upgrading network equipment and electronic teaching tools, regularly updating device functions, and replacing outdated equipment to meet the normal usage needs. One of the distinguishing features of online learning compared to traditional learning is the provision of diverse technological support. Effective technological support can transform classroom structures and enrich teaching methods. The higher the learner's acceptance of technology, the more useful and user-friendly the resources in the online learning environment will be, leading to a higher degree of acceptance of online teaching. Additionally, from the perspective of the complexity of operating teaching equipment, complicated and cumbersome teaching software can hinder the smooth conduct of online teaching activities and challenge the capabilities of learners in the online learning environment. Therefore, simple and efficient technological support is particularly important.

5.2 Recommendation

5.2.1 Enhancing Self-Efficacy

Bandura believes that mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal have a crucial impact on an individual's self-efficacy (Zhu & He, 2022). Self-efficacy is influenced by the success or failure of behavior—successful behavior has a positive effect, while failure has a negative effect. Vicarious experiences refer to the self-efficacy we gain by observing the successes or failures of others. Simply put, when an individual observes someone similar to themselves succeed in a particular task, they are more likely to believe that they, too, can achieve success in that task, thereby enhancing their self-efficacy, and vice versa. Verbal persuasion mainly involves encouragement from teachers, peers, and parents, helping students believe that they have the ability to complete learning tasks through effort. A high level of emotional arousal can, to some extent, stimulate students' interest and motivation in learning, making them more willing to invest time and effort into their studies and have greater confidence in successfully completing a learning task, thus enhancing their self-efficacy.

Therefore, in online learning, teachers can set differentiated goals based on students' abilities, and reasonably assign group members during collaborative learning according to students' learning abilities and gender. This approach can enhance students' behavioral engagement by positively influencing them through their peers. By setting tiered learning goals, students with different abilities can experience success, which fosters confidence and enhances their self-efficacy.

In regular teaching practices, teachers can also use verbal reminders and emotional encouragement to motivate students. For instance, teachers can use a "like" function to praise students for their classroom performance and completed assignments. They can also use real-time connections and multi-screen sharing to showcase students' work, helping them feel recognized by both teachers and peers. These strategies aim to enhance self-efficacy, which in turn improves students' overall engagement in learning.

5.2.2 Enhancing Teachers' Competence

Teachers should be willing to change their classroom teaching methods, fully leveraging the technological support provided by online learning to inspire students' enthusiasm, engage them actively, and foster effective interaction. This approach maximizes students' initiative and supports the sustainable development of their intellectual potential.

From the perspective of partnering enterprises, it is important to guide and train teachers in the operation and use of technological equipment, while paying attention to their practical needs. Training should be targeted and tiered. For instance, teachers with stronger technical skills can be encouraged to innovate in the classroom using technology, while those with weaker skills should first be given opportunities to observe and learn before being encouraged to use the technology themselves. Support during classroom teaching can be provided to gradually convey the value of technology, thereby empowering the use and promotion of smart classrooms.

From the school's perspective, optimizing the evaluation and assessment system can motivate teachers to participate in relevant training. Schools arrange teachers to observe and learn from exemplary cases, hold open class competitions, and deepen the implementation of resource sharing and collaboration. For example, schools can establish shared resource libraries with outstanding schools and encourage teachers to

upload exemplary lesson plans, teaching videos, and other materials to facilitate the sharing and building of teaching resources.



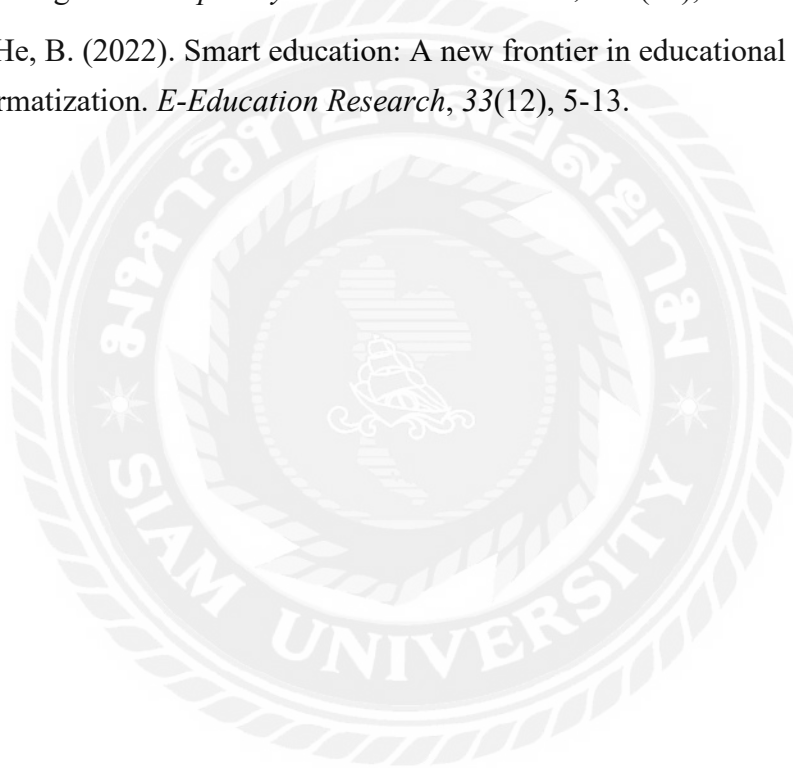
Reference

- Biggs, J. B., & Tang, C. (2007). *Teaching for quality learning at university*. Open University Press.
- Chen, H., & Wang, C. (2023). The impact of vocational identity on learning engagement among higher vocational students: The mediating role of achievement goal orientation and academic self-efficacy. *Vocational Education Forum*, 11, 63-69.
- Chen, H., & Xie, Q. (2021). Empirical analysis of college students' online learning experiences and their differences. *Chinese University Teaching*, 12(12), 74-81.
- Chen, W., & Ye, X. (2021). Design of screens in future classrooms: An interactive perspective. *Journal of Distance Education*, 31(05), 23-31.
- Chen, X. (2018). Deep teaching: Exploring a high school physics teaching model oriented towards core competencies—A case study of the "law of universal gravitation" teaching. *Fujian Basic Education Research*, (10), 116-117.
- CNNIC. (2023, March 2). *The 51st Statistical Report on the Development of the Internet in China*. Author.
- Duan, J., & Yu, S. (2018). Research on deep learning in e-Learning from the perspective of learning sciences. *Journal of Distance Education*, (4), 43-51.
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59-109.
- Gu, M. (1998). *Great dictionary of education: Revised and expanded edition*. Shanghai Education Press.
- Gu, X. (2015). Beyond fragmented learning: Semantic diagrams and deep learning. *Chinese Journal of Educational Technology*, (3), 38-49.
- He, K., & Li, W. (2009). *Educational technology* (2nd ed.). Beijing Normal University Press.
- Hiltz, S. R. (1994). *The virtual classroom: Learning without limits via computer networks*. Ablex Publishing Corp.
- Hu, H., & Dong, Y. (2017). Technology-enhanced deep learning: Theoretical construction and empirical research on "personalized-collaborative learning." *Journal of Distance Education*, (3), 48-61.
- Jia, W., Guo, Y., & Zhao, Z. (2020). Cluster analysis of college students' online learning experiences. *Chinese Higher Education Research*, (4), 23-27.

- Jia, X., Cai, L., Lin, L., & Lin, C. (2020). The relationship between high school students' perceived teacher support and learning engagement: The chain mediating effects of academic self-efficacy and achievement goal orientation. *Psychological Development and Education, 6*(2), 700-707.
- Jin, H., Shao, Y., & Hu, Y. (2018). Building and innovating intelligent educational ecosystems: Insights from the Horizon Report (2018 Higher Education Edition). *Journal of Distance Education, 36*(05), 3-14.
- Kasperski, R., & Blau, I. (2020). Social capital in high schools: Teacher-student relationships within an online social network and their association with in-class interactions and learning. *Interactive Learning Environments, 1-17*.
- Li, J., & He, L. (2021). Promoting students' deep learning. *Computer Education and Teaching, (5)*, 29-30.
- Li, R. (2016). *Development of a measurement scale for university students' online learning engagement* (Master's thesis). Shenyang Normal University.
- Li, S., & Yu, C. (2015). Development and application of a scale for evaluating distance students' learning engagement. *Open Education Research, 21*(06), 62-70, 103.
- Liang, Y. (2018). The impact of rubric-based peer assessment on cognitive and emotional engagement and learning outcomes in online learning. *Educational Technology Research, (9)*, 66-74.
- Liu, B., Zhang, W., & Liu, J. (2017). The impact of teacher support on online learners' engagement. *Educational Technology Research, 38*(11), 63-68, 80.
- Lu, J., & Churchill, D. (2019). The effect of social interaction on learning engagement in a social networking environment. *Interactive Learning Environments, 22*(4), 401-417.
- Marton, F., & Saljo, R. (1976). On qualitative differences in learning I: Outcome and process. *British Journal of Educational Psychology, 46*(1), 4-11.
- Ministry of Education. (2010). *National outline for medium and long-term education reform and development (2010-2020)*. Author.
- Ministry of Education. (2020). *Guidelines on organizing and managing online teaching in higher education institutions during the pandemic prevention and control period*. Author.
- Moore, M. G. (1993). Three types of interaction. *In Distance Education New Perspectives, 3*(2), 1-7.

- Rao, A., & Wan, K. (2020). The impact of online learning readiness on college students' online learning engagement. *Educational Science*, 36(02), 31-38.
- Redmond, P., et al. (2018). An online engagement framework for higher education. *Online Learning*, 22(1), 183-204.
- Ren, Y., Zhao, L., & Liu, M. (2015). How far are MOOCs from personalized learning? An analysis based on the design of 10 domestic and international MOOCs. *Modern Distance Education Research*, (06), 3-10, 29.
- Schaufeli, W. B., Salanova, M., González-Romá, V., & others. (2002). The measurement of engagement and burnout: A two-sample confirmatory factor analytic approach. *Journal of Happiness Studies*, 3(1), 71-92.
- Sun, Y. (2023). A chain mediation model study of parenting styles and academic self-efficacy. *China Metallurgical Education*, 6, 89-94.
- Thurmond, V. A., & Wambach, K. (2004). Understanding interactions in distance education: A review of the literature. *International Journal of Instructional Technology & Distance Learning*, 1(1), 9-33.
- Wagner, E. D. (1994). In support of a functional definition of interaction. *American Journal of Distance Education*, 8(2), 6-29.
- Wang, Y. (2013). An empirical study of college students' learning engagement: Based on the 2012 National College Student Learning Survey data. *Chinese Higher Education Research*, 26(01), 32-36.
- Wang, Y., Qiu, H., & Ye, Y. (2022). Research on factors affecting and improving learning engagement based on a blended teaching model. *Journal of Hubei Open Vocational College*, 35(12), 150-160.
- Wu, M., & Li, H. (2015). A review of MOOC research. *China Educational Technology & Equipment*, (12), 168-169.
- Xia, X., & Yuan, Z. (2020). Research on the construction path of teacher-student relationships in virtual interactive scenarios in higher education. *Heilongjiang Higher Education Research*, (03), 35-39.
- Xu, K. (2021). The connotations, characteristics, and implications of MOOCs for lifelong education in China. *Vocational and Technical Education*, 35(28), 60-63.
- Zhang, G., Geng, J., & Huang, L. (2019). A study on the learning engagement of open university students. *Open Education Research*, 25(04), 91-99.
- Zhang, S., Liu, Q., Lei, S., & others. (2017). Research on learners' engagement in online learning spaces: Big data analysis of online learning behaviors. *Chinese Journal of Educational Technology*, (4), 24-40.

- Zhang, W., Jiang, Q., & Zhao, W. (2020). Designing and practicing an online collaborative knowledge construction teaching model from the perspective of learning engagement. *Open Learning Research*, 25(04), 43-62.
- Zheng, Y., Wang, Y., & Wang, Y. (2021). Educational scientific research in the intelligent era: Connotations, logical framework, and practical approaches. *Chinese Distance Education*, (06), 1-10.
- Zhong, Z., & Yang, L. (2002). On online learning. *Modern Distance Education*, (01), 30-34.
- Zhou, X., & Lu, S. (2023). The dilemmas and solutions of curriculum content development in higher vocational colleges from the perspective of tacit knowledge. *Contemporary Vocational Education*, 121(01), 87-94.
- Zhu, Z., & He, B. (2022). Smart education: A new frontier in educational informatization. *E-Education Research*, 33(12), 5-13.



Appendix

Dear Student,

Thank you for taking the time to complete this questionnaire. This study aims to investigate engagement in online learning and its influencing factors. All questions are based on the assumption that you have participated in online learning, so please answer according to your own learning experiences. The data collected through this questionnaire will be used solely for analysis in a graduation thesis and will not compromise your privacy. Your support and cooperation are sincerely appreciated. Wishing you all the best!

Section 1: Basic Information					
1. What is your gender?					
A. Boy					
B. Girl					
2. What is your grade level?					
A. Grade 1					
B. Grade 2					
C. Grade 3					
D. Grade 4					
3. Approximately how long do you spend on each online collaborative learning session?					
A. Less than 1 hour					
B. 1-3 hours					
C. 3-6 hours					
D. More than 6 hours					
Section 2: Online Learning Engagement Scale					
Please carefully read the items in the table below and mark a "√" under the answer that best matches your actual situation.					
	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1. I believe I can effectively solve difficulties and challenges encountered in online learning.					
2. I believe I can proactively seek and utilize additional learning					

resources to enhance my learning outcomes.					
3. I believe I can persist in completing all assignments and projects in the online course, even when facing difficulties.					
4. I believe I can understand and apply complex concepts and knowledge gained from the online course.					
5. I believe I can manage my time effectively for online learning and maintain my study progress.					
6. I believe I can collaborate and communicate effectively with classmates in the online course.					
7. I believe I can utilize the tools and features of the online learning form to optimize my learning experience.					
8. I believe I can seek help when needed and continuously improve my learning strategies based on feedback.					
9. In the online course, the teacher regularly poses questions for us to discuss in the forum.					
10. The teacher responds to my questions promptly.					
11. I have replied to the instructor's messages and questions.					
12. The teacher provides additional learning resources through the course platform and encourages us to ask questions related to these resources for discussion.					
13. After the course ends, the teacher organizes online office hours to					

ress our questions and discuss our gress.					
14. I frequently receive onalized feedback from the teacher ny assignments or discussion posts, ch makes me feel supported and ted.					
15. Overall, I have had a lot of raction with other learners in the ne course regarding the course tent.					
16. I have received valuable back from other learners in the ne course.					
17. I communicate with other ners about the course content ugh various methods such as offline ussions, QQ, WeChat, and ussion forums.					
18. I respond to classmates' stions in different ways, such as ugh discussion forums or email.					
19. I share my thoughts and lications of the course content with er classmates.					
20. I provide feedback on other smates' ideas and perspectives.					
21. The platform provides ficient virtual classrooms and ting functions to support real-time raction and discussion.					
22. The platform has a prehensive learning resource ary, including course materials, o lectures, and relevant documents, ch meets my learning needs.					

23. The platform is equipped with interactive online assessment tools that promptly track and provide feedback on students' progress and grades.					
24. The platform offers various interactive tools, such as discussion boards, instant messaging, and Q&A features.					
25. The platform has a user-friendly interface and navigation features, allowing me to easily access course content and manage my learning activities.					
26. I attend each online learning session on time.					
27. During the online learning process, I carefully take notes on important points discussed by the instructor in class.					
28. I am able to complete various learning activities set by the instructor online learning (such as tests, assignments, and forums) and achieve good results.					
29. I diligently study the various learning resources provided in the online course.					
30. Before starting online learning, I create an appropriate study plan for myself.					
31. During the online learning process, I use learning strategies and methods to understand and master important concepts.					

32. I frequently analyze, summarize, and integrate online learning resources with my previous knowledge and experience.					
33. I enjoy learning through the online learning platform.					
34. I am very interested in the content of online learning.					
35. When completing learning tasks in online learning, I experience a sense of satisfaction and achievement.					

