

THE EFFECT OF LEARNING SELF-CONTROL ON LEARNING ENGAGEMENT OF HIGH SCHOOL STUDENTS UNDER WEBCAST TEACHING: THE MEDIATING EFFECT OF LEARNING SATISFACTION

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Abstract: Purpose: The purpose of this study is to investigate the mediating role of learning satisfaction in learning self-control and learning engagement in live online learning. 12,880 high school students are surveyed using the Chinese version of the learning self-control, learning satisfaction and learning engagement scale, and the correlation analysis showed that there is a positive correlation between learning self-control, learning satisfaction and learning engagement. The mediation effect analysis showed that after controlling for variables such as grade level, solitary or not, academic performance, and school level, learning satisfaction partially mediated the relationship between learning self-control and learning engagement, which means that students' self-control influenced their learning engagement through online teaching satisfaction. Thus, it is concluded that teachers in online teaching should enhance the quality and improve the teaching aspects to increase students' satisfaction, which in turn will enhance students' learning engagement and guarantee the effectiveness of online teaching.

Keywords: High school students; Self-control; Engagement; Satisfaction; Online learning

1 PROBLEM RAISED

The development of information technology has enabled more webcast teaching to be carried out. Webcast teaching not only breaks through the space limitation of both teachers and students, but also breaks through the time limitation due to its functions of playback and recording. In addition to the mutually agreed learning time, students can flexibly arrange their own learning plans and tasks, while students save preparation time before class and can enter the learning state faster. But it also has certain shortcomings. First, its lack of teaching atmosphere and its inability to ensure teaching effectiveness, and students' sense of belonging is poor. Second, in a smart learning environment, some students are not yet aware of the advantages of playing the function of technology to enhance learning efficiency, but only focus on the technology itself and lead to a lack of concentration in learning. Finally, the biggest problem of online courses is that students do not have strong self-discipline in learning. In an online learning environment, teachers have limited ability to supervise students' learning process and cannot control whether students listen carefully and complete exercises and assignments on time and in quantity. Therefore, students' self-control will affect their learning effectiveness.

Students are originally under great pressure to learn, and the new online learning conducted by the webcast teaching will make them anxious, which will lead to the impact of learning engagement and so on[1,2]. In addition to the change of teaching methods, students' own factors such as internal learning drive[3], learning self-efficacy[4], and students' learning self-control are also an important influencing factor[5]. Students' self-control is an important determinant of teaching effectiveness, and Kopp defines it more fully: self-control is the ability of individuals to regulate their behavior to match their personal values and social expectations, and consists of five main aspects: suppressing impulsive behavior, resisting temptation, delaying gratification, developing and completing behavioral plans, and adopting socially appropriate behavior[6]. Numerous studies have shown that academic self-control affects students' academic performance[7-9]. Students with poor academic self-control are more likely to develop problems such as boredom[10], emotional exhaustion[11] and negativity[12], and have an impact on engagement in learning[13-15]. If students invest more time in their learning, the more they will learn. Learning engagement refers to students' concentration and effort in learning, understanding or mastering knowledge and skills, and includes cognitive engagement, affective engagement and behavioral engagement[16]. Research has found that engagement in learning is a positive predictor of academic achievement[17] and also a key factor in addressing issues such as student burnout, loneliness and dropout[17]. Online learning engagement refers to the extent to which students are engaged in interactive online learning activities and learning experiences. Therefore, research on learning engagement is one of the most important elements in analyzing students' academic achievement. Other studies have found that the degree of student satisfaction with learning affects their learning engagement and the higher the satisfaction the higher the engagement. In an online environment, the quality of service and information affects user satisfaction. There is a correlation between users' online course learning satisfaction and students' final grades. Online live learning platform satisfaction is a systematic assessment made by students after perceiving the characteristics of the platform, and is an emotional response and psychological feeling formed by students during their long-term experience of using the platform.

It can be inferred that the higher the student's self-control, the higher the student's satisfaction with learning, and the higher the student's learning satisfaction, the higher the student's learning engagement, and the higher the student's learning self-control, the higher the student's learning engagement. In conclusion, this study analyzes the mediating relationship between learning satisfaction in learning self-control and learning engagement by taking high school students as the research object. It provides a reference and basis for improving education and teaching, promoting students' value-added development and psychological health growth.

2 RESEARCH METHOD

2.1 Research Object

In this study, sampling is conducted from first-tier, second-tier and third-tier cities based on different levels of economic development, and the studies are all conducted with high school freshmen, sophomores and juniors as subjects. 12,880 high school students are randomly selected from Guangdong Province, and these students are evaluated to be 16.45 years old ($SD=1.44$), between the ages of 16-19, and included 5,083 male students (48.3%). This study is approved by the ethics committee of University of Electronic Science and Technology of China, Zhongshan Institute and the principal of the participating schools. The selected students are resource participants and are not provided with an incentive to complete the questionnaire. After completing this test in the study by asking the subjects to provide information including gender, age, and solitary status, and thereafter students completed the Learning Self-Control, Learning Satisfaction and Learning Engagement scales, the counseling center or teachers at the subject's school are informed of any counseling and services needed.

2.2 Research Tools

2.2.1 Learning self-control scale

"Learning Self-Control", prepared by Zhang Lingcong and revised by Zhang Yeyun, is adopted. The scale consists of 38 questions and contains three dimensions, which are self-control sense, self-control tendency, and self-control strategy. The self-control sense includes sub-dimensions such as task efficacy, self-awareness, and self-monitoring; the self-control tendency includes sub-dimensions such as planning, persistence, and summarization; the self-control strategy includes sub-dimensions such as emotional control, environmental control, help-seeking strategy, and remediation. The scale is scored on a 5-point Likert scale, from 1 to 5, indicating, respectively, completion does not meet, does not quite meet, somewhat meets, meets, and fully meets. After statistical analysis, the scale Cronbach α coefficient is found to be 0.842.

2.2.2 Learning engagement scale

"The Utrecht Work Engagement Scale-student" by Schaufeli is adopted. The scale consists of 17 items, and the questionnaire is scored on a 7-point Likert scale, representing never, almost never, rarely, sometimes, often, very often, and always, from 1 to 7, respectively. The questionnaire is divided into three dimensions, which are engaged motivation, engaged energy, and engaged concentration. The scoring is cumulative according to the selected numbers. The Cronbach α coefficient of the scale is found to be 0.950 after statistical analysis.

2.2.3 Online learning satisfaction questionnaire

The online learning satisfaction questionnaire is adapted from the "Learning Satisfaction Questionnaire" developed by Liu Li et al. The research is conducted in terms of learning format, effectiveness, Q&A, and resources. The questionnaire is scored on a 5-point Likert scale from 1 to 5, representing very dissatisfied, dissatisfied, and average, satisfied, and very satisfied, respectively. After statistical analysis, the Cronbach alpha coefficient of the scale is found to be 0.918.

2.3 Data Processing

SPSS 19.0 software and Process 3.4 are applied for data processing and results analysis in this research.

3 ANALYSIS OF RESULTS

Table 1 Correlation Analysis of Learning Self-Control, Engagement and Satisfaction

| | 1 | 2 | 3 |
|------------------------------|------------------|------------------|------------------|
| 1. Learning behavior control | 1 | | |
| 2. Learning engagement | 0.621*** | 1 | |
| 3. Learning satisfaction | 0.411*** | 0.534*** | 1 |
| M \pm SD | 3.20 \pm 0.211 | 4.51 \pm 0.317 | 3.74 \pm 0.341 |

3.1 Regression Analysis of Learning Self-Control, Learning Engagement and Satisfaction

In the regression analysis of learning self-control and learning satisfaction, students' summative, help-seeking strategies, persistence, and self-awareness had a predictive effect on learning satisfaction. The variables of summative, self-awareness, and help-seeking strategies in learning self-control had significant predictive effects on learning engagement, as shown in Tables 2 and 3.

Table 2 Linear Regression Analysis of High School Students' Learning Satisfaction on the Learning Self-Control Dimension

| Order of Selected Variables | Multiple Correlation Coefficient R | Decision Factor R ² | Increase the Amount of Explanation ΔR ² | t Value | Net F Value |
|-----------------------------|------------------------------------|--------------------------------|--|---------|-------------|
| Summative | 0.401 | 0.160 | 0.157 | 14.37 | 710.89*** |
| Help-seeking Strategies | 0.414 | 0.171 | 0.016 | 6.65 | 389.20*** |
| Persistence | 0.421 | 0.178 | 0.004 | -4.665 | 272.79*** |
| Self-awareness | 0.427 | 0.183 | 0.005 | 5.41 | 211.92*** |
| Mission Effectiveness | 0.429 | 0.184 | 0.002 | 2.8 | 171.38*** |
| Emotional Self-control | 0.431 | 0.186 | 0.002 | -2.65 | 144.23*** |

Table 3 Linear Regression Analysis of High School Students' Learning Engagement on the Learning Self-Control Dimension

| Order of Selected Variables | Multiple Correlation Coefficient R | Decision Factor R ² | Increase the Amount of Explanation ΔR ² | t Value | Net F Value |
|-----------------------------|------------------------------------|--------------------------------|--|----------|-------------|
| Summative | 0.583 | 0.340 | 0.240 | 94.10*** | 10769.54*** |
| Self-awareness | 0.610 | 0.373 | 0.032 | 47.94*** | 6199.81*** |
| Help-seeking Strategies | 0.624 | 0.390 | 0.017 | 34.61*** | 4447.54*** |
| Mission Effectiveness | 0.629 | 0.396 | 0.006 | 31.74*** | 3421.24*** |
| Persistence | 0.632 | 0.399 | 0.003 | 25.68*** | 2775.70*** |
| Planned | 0.633 | 0.401 | 0.001 | 21.79*** | 2325.89*** |
| Environmental Control | 0.634 | 0.401 | 0.001 | 19.76*** | 1998.816*** |

3.2 Mediating Role of Satisfaction in the Effect of High School Students' Learning Self-Control on Engagement

First, the Model4 model in ProcessV4.3 software prepared by Hayes is adopted to test the mediating effect of school satisfaction in the relationship between academic self-control and learning engagement, controlling for variables such as academic achievement, grade level, solitary student or not, and school level. The results (see Tables 4 and 5) show that learning self-control has a significant predictive effect on learning engagement, and the predictive effect of learning self-control on learning engagement remains significant after putting in the mediating variable learning satisfaction. Therefore, the positive predictive effect of learning satisfaction on learning engagement is significant. In addition, the upper and lower limits of the bootstrap 95% confidence intervals for the direct effect of learning self-control on the effect of learning engagement and the mediation effect of learning satisfaction did not contain 0 (see Table 5). It indicates that learning self-control not only predicted learning engagement but also is able to predict learning engagement through the mediating effect of learning satisfaction. This direct and mediating effect accounted for 78.57% and 21.43% of the total effect, respectively.

Table 4 Learning Satisfaction Mediation Model Test

| Regression equation | Fitted index | | | Significance | |
|-------------------------------|--------------|----------------|-------------|--------------|-----------|
| | R | R ² | F (df) | B | t |
| Learning satisfaction | 0.311 | 0.081 | 70.14 (5) | 2.55 | 2.31*** |
| Learning Engagement | 0.517 | 0.301 | 2478.91 (5) | 0.678 | 7.187*** |
| Degree of learning engagement | 0.445 | 0.212 | 179.51 (5) | 1.605 | 14.053*** |

Table 5 Decomposition of Total Effect, Direct Effect and Mediating Effect

| | Effect Value | Boot Standard | Boot CI Lower | Boot CI Upper | Relative Value |
|--|--------------|---------------|---------------|---------------|----------------|
| | | | | | |

| | | Error | Limit | Limit | |
|---|-------|-------|-------|-------|--------|
| Total Effect | 0.687 | 0.030 | 0.547 | 0.711 | |
| Direct Effect | 0.497 | 0.022 | 0.378 | 0.559 | 72.34% |
| Mediating effect of teaching satisfaction | 0.190 | 0.014 | 0.017 | 0.171 | 27.66% |

4 DISCUSSION AND CONCLUSION

Learning self-control has a significant effect on learning engagement, and teaching satisfaction produces a mediating effect. Students' satisfaction with teaching in live online learning will enhance students' learning engagement. Currently, students have more poor self-control and procrastination behaviors. Without the regulation and restraint of classroom management in offline teaching, it is difficult for teachers to continuously focus students' attention on classroom teaching, therefore, the quality of teachers' teaching also affects students' learning engagement, and students' learning engagement is also high when students are satisfied with teaching. Teachers who want to attract students' attention need to adapt the content and aspects of teaching, adopt heuristic and problem-based learning models, and focus on guiding students' self-learning and cooperative learning skills to enhance their use of information technology. If teachers fail to improve the quality of teaching and learning, it will affect students' engagement in learning activities and will have a negative effect on students' self-control of learning. Therefore, when enhancing students' learning self-control, teachers should improve the quality of teaching, otherwise it will affect the summative of learning, help-seeking strategies, persistence, and self-awareness. Teachers should also place students at the center of learning through multiple forms of online learning, using participatory, collaborative, and project-based forms of instruction. If teachers' teaching quality is not high, then students' summative skills will be difficult to develop and will affect the persistence of their learning.

5 PROSPECT

Live online learning is a systematic project, which not only involves the functionality and convenience of the technology platform, but also is influenced by the individual characteristics of the student population and the quality and means of teachers' teaching, thus requiring further optimization of teaching contents, teaching methods and technologies. Although some of the results of this study have been obtained, there are still some shortcomings in the study because the live online learning is influenced by the subjective and objective factors such as individual students, parents, teachers' teaching and equipment functions. Therefore, further analysis and research are needed to address many factors such as teachers' online teaching methods, individual students and families.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

FUNDING

This study was supported by the Guangdong Social Science Planning 2021 Project Construction of the Value-added Evaluation system for Adolescents' Mental Health based on Digitalization (No. GD21CJY12): Guangdong Provincial Department of Education 2024 Guangdong Province Regular Higher Education Institutions Featured Innovation Projects Approved List: Action Research on Building a Model for College Students' Innovation Competence to Boost the Enhancement of New Quality Productivity (2024WTSCX177).

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