Student Engagement in Fully Online Learning Environment Impact on the Academic Retention

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Abstract: Online education provides students with more learning opportunities, but the depth and breadth of students' participation in online learning needs to be improved. Using Structural Equation Modeling (SEM), the article examines the impact of student participation in an online learning environment on academic retention. The experimental results show that when the student participation rate reaches 97.7%, academic retention can reach 99.3%. From this we can draw the following conclusions: (1) In a fully online learning environment, the higher the degree of student engagement is, the higher the academic retention is; (2) in a fully online learning environment, students' self-efficacy is positively correlated with academic retention; (3) in a fully online learning environment, teachers have a relatively small effect on student engagement and academic retention; (4) the higher the degree of teacher engagement is, the greater its impact on student academic retention is. The findings of the article can help schools develop more effective strategies to improve student engagement and academic retention, thereby improving the effectiveness of online learning for students.

1. Introduction

With the continuous development of information technology, online education has become a new educational model and is widely used in various higher educations. Academic retention of students is an important indicator to measure students' learning effectiveness and an important basis for teachers' teaching design and teaching activities. When students participate in online learning, if the learning support system designed by teachers can well meet the needs of students, it can effectively promote student academic retention. However, in actual teaching environments, the learning support systems designed by teachers often fail to meet the needs of students, resulting in low levels of student academic retention. Then, how to enable teachers to better meet the needs of students when designing online learning support systems has become an important research topic.

At present, scholars have studied online learning from multiple perspectives. Among them, Liu Tong explored the moderating effect of time management disposition of junior college nursing students on online learning engagement and deep learning. The results show that the online learning input of junior college nursing students has a greater impact on online deep learning, and the time management tendency has a moderating effect between the two. The higher time management

tendency of junior college nursing students can enhance the effect of learning input on deep learning, and then promote the effect of deep learning [1]. Wang Guohua conducted research around the question "Why do online learners hide knowledge?" The results found that the learning environment, knowledge or problems, atmospheric factors, and personal factors have an impact on online learners' knowledge hiding behavior. His research aims to help educators scientifically understand the knowledge hiding behavior of learners in online learning communities, help build online learning communities, and improve online learners' learning outcomes [2]. Zhang Qing mainly conducted attribution analysis from the five dimensions of learner, teacher, interaction, curriculum, and technology. Among them, more emphasis is placed on the first three dimensions. The ability and level of the learner is the most important dimension that affects the effect of online learning. In the learner dimension, self-efficacy, information literacy, gender, autonomous learning ability, and learning style are the key factors that affect the effect of online learning. Teacher input in the teacher dimension and teacher-student interaction, student-student interaction, and participation in the interaction dimension are the main factors [3]. Although these studies are helpful in improving online learning effectiveness, the link between it and academic retention is missing.

The article uses self-efficacy as an intermediary variable, analyzes the influence of teachers on student engagement and academic retention in a fully online learning environment through Structural Equation Model (SEM), and explores how online learning support systems can be designed to promote student academic retention based on differences in student engagement.

2. Raising the Question

Online education can break the constraints of time and space, provide students with more learning opportunities, and stimulate students' interest in learning. Students participating in the online learning environment can provide them with rich learning resources, space for independent exploration, learning support services, evaluation and feedback services, and help them master new knowledge and skills. However, due to the virtual, interactive and personalized characteristics of online education, the depth and breadth of students' participation in the online learning environment needs to be improved. Therefore, it is necessary to study the impact of the degree of student participation in the online learning environment on academic retention in online education [4].

In a fully online learning environment, students can study independently through computers, and can also communicate and discuss with other students. While student engagement has a significant impact on academic retention, the relationship between the two is not linear. According to existing research results, in a fully online environment, student engagement affects academic retention; while in other forms of online education (such as online tutoring), academic retention is jointly affected by engagement and self-efficacy. This means that in different forms of online education, academic retention varies according to the degree of participation and self-efficacy [5-6].

However, although there are many factors that affect academic retention in a fully online learning environment, the discussion of the relationship between these factors is still lacking in existing research. In order to explore the relationship between student participation and academic retention in a fully online environment, the article uses structural equation modeling to analyze the collected data [7]. SEM is an analytical method that identifies potential paths, explores causal relationships, integrates structural equation modeling theoretical models, and integrates multivariate models by constructing a relationship model between multiple explanatory variables and observed variables. The advantage that SEM has is that it can study the potential relationship and causal relationship between variables, instead of only exploring the relationship between one or a few variables at a time. SEM can also separate latent variables from observed variables because

observed variables exist in the equation independently of latent variables. SEM is suitable for explaining structural models of potential relationships between multiple explanatory variables and between multiple explanatory variables and latent variables, and can help researchers reveal and explain these potential relationships [8-9].

3. Theoretical Basis and Research Hypothesis

Based on student-centered learning theory, technology acceptance models, and self-efficacy, this article explores the impact of student participation in a fully online learning environment on academic retention.

First, the Technology Acceptance Model was proposed by a professor at the School of Education of Stanford University in 1989 [10]. The model believes that when there is a certain distance between technology and users, users will have resistance. At this time, the greater the psychological distance of users is, the less likely they are to accept new technologies. On the contrary, the closer the distance between users and technologies, the easier it is for users to accept new technologies. This model can be used to explain the academic retention behavior of students in online learning [11].

Second, self-efficacy was proposed by an American psychologist in 1969 [12]. Self-efficacy is an individual's judgment and belief about whether he or she is capable of completing a task. It includes four dimensions: ability, effort, relevant experience, and outcome expectations. In a fully online learning environment, the higher a student's self-efficacy is, the easier it is to maintain a level of academic retention in that environment [13]. There are two main measurement methods for self-efficacy, one is the self-efficacy scale (SES), and the other is the multiple regression analysis method that combines the self-efficacy scale with other variables. The advantage of SES is that it can measure many different variables, such as learning motivation, learning effort and grades, etc., but it also has deficiencies, such as not being able to distinguish the relationship between effort and ability, and not being able to distinguish the differences between students within a class and between classes. The multiple regression analysis method combining the self-efficacy scale with other variables can well make up for the deficiency of SES. Multiple regression analysis is a method of linear combination of multiple variables, which can overcome the shortcomings of SES [14].

Third, both technology acceptance models and self-efficacy focus on the role of teachers. In a fully online learning environment, teachers act as providers of information and learning resources, student guides, and helpers. Their roles are to promote student learning, provide assistance to students, and assist students in completing homework. Therefore, teachers have a strong influence on students' academic retention in a fully online learning environment [15].

Fourth, self-efficacy is an egocentric concept. It focuses primarily on an individual's assessment and beliefs about their own abilities and skills. In a fully online learning environment, students are both recipients and creators of information and knowledge. As a result, students have high ratings of their own abilities and skills, and they believe they can effectively complete their learning tasks in a fully online learning environment. At this time, students have higher expectations of academic retention [16].

4. Research Design

The article takes college students in a certain country as the research object, takes students' participation in a fully online learning environment and academic retention as dependent variables, and uses self-efficacy, teacher engagement and academic retention as independent variables, and adopts a structural equation model to explore the impact of student participation in a fully online

learning environment on academic retention. The article uses the Likert scale to measure the online learning environment and academic retention, divides the online learning environment into two dimensions of engagement and academic retention, and divides academic retention into two dimensions of engagement and academic retention. The reliability and validity test results of the questionnaire show that the questionnaire has good reliability and validity. In order to ensure the stability of the model, the reliability analysis of the initial questionnaire was carried out first. The results are shown in Table 1.

Table 1: Reliability analysis result table

	Student engagement	Academic retention
Kaiser Meyer Olkin	0.725	0.718
Bartlett spherical test values	0.705	0.711
Total variance interpretation rate	44.8%	44.5%
Maximum variance interpretation rate	21.3%	21.6%

The results show that the KMO values of the two factors of student participation and academic retention are 0.725 and 0.718, and the Bartlett spherical test values are 0.705 and 0.711, both of which are greater than 0.7. The total variance explained rate is 44.8% and 44.5%, and the maximum variance explained rate is 21.3% % and 21.6%, indicating that the questionnaire has good internal consistency. It can be concluded that the scale has good reliability and validity.

The article uses AMOS7.0 for data analysis. The data analysis mainly includes the following steps: firstly, the reliability analysis is carried out, and the internal consistency coefficients among the variables are all greater than 0.7; secondly, the validity analysis is carried out to test the structural validity among the variables; then the structural equation model (SEM) is established by using AMOS7.0; finally, the model is revised and tested according to the measurement model. The data analysis methods used in the article include: descriptive statistics, correlation analysis, regression analysis and so on.
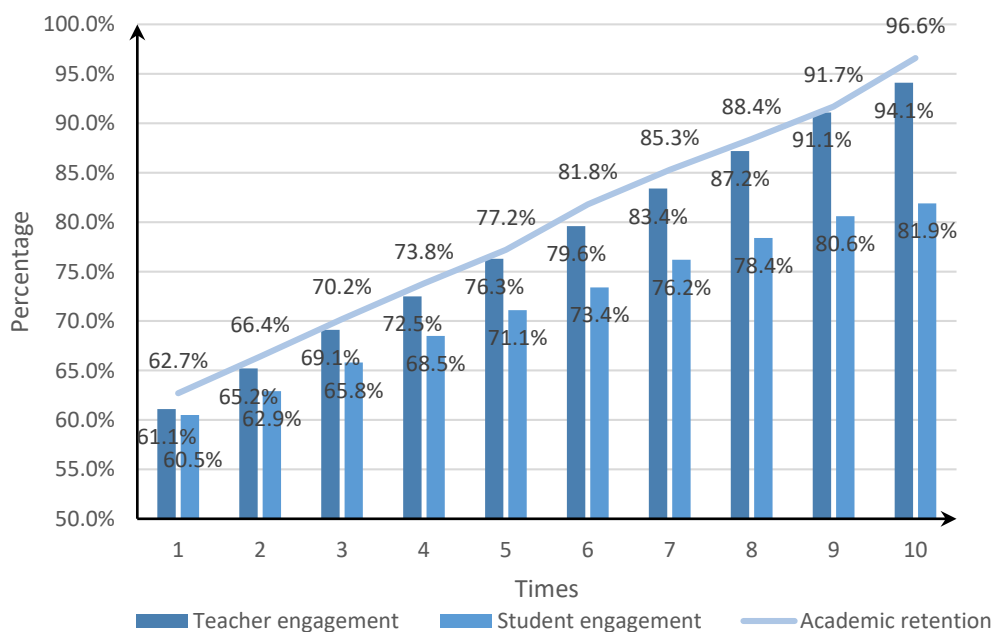
5. Results and Discussion

Figure 1: Teacher engagement correlations

The article firstly conducted relevant experiments based on the impact of teacher participation on student engagement and academic retention. The second step examined the relationship between student engagement and academic retention. The results are shown in Figure 1 and Figure 2.

It can be seen from Figure 1 that in the 10th experiment, the teacher participation and academic retention both reached about 95%, while the student participation remained at 81.9. It can be seen that with the increase of teacher participation, academic retention has also increased significantly, although student participation has also increased, but the magnitude is not as good as the former two.
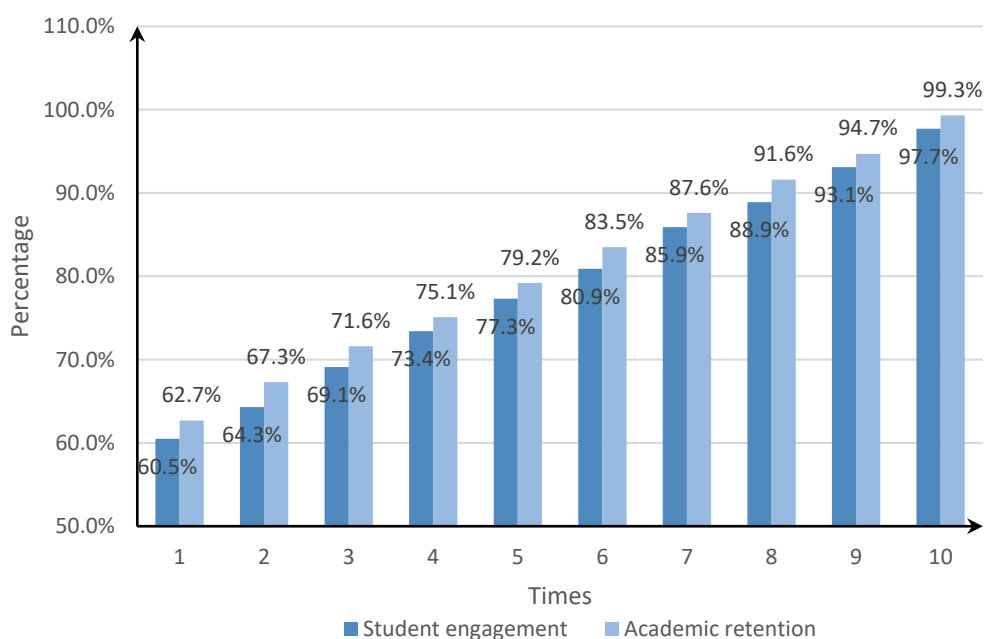

Figure 2: Student engagement correlation

In Figure 2, when the student participation rate reaches 97.7%, the academic retention reaches 99.3%. It can be seen that the increase of student participation can also drive the increase of academic retention, and the increase effect even exceeds the effect of teacher participation. Finally, the method used in the article is compared with other methods, and the results are shown in Figure 3.

It can be seen from Figure 3 that among other methods, the highest degree of academic retention is 94.3%, the lowest is 91.7%, and the calculated average value of academic retention is 92.84%; in the method used in the article, the highest degree of academic retention is 99.4%, the lowest is 96.4%, and the calculated average of academic retention is 97.48%. It can be seen that the method used in the article can effectively improve the degree of academic retention.

Based on the above results, it can be found that students' participation in the online learning environment can promote the improvement of their academic retention. This is because students with a high degree of participation use information technology and the Internet more frequently and proficiently in the learning process, and they are more inclined to view online learning as a process of exploring the online world and discovering new things, rather than A process of passive acceptance of knowledge. By acquiring knowledge autonomously, they are better able to adapt to the online learning environment, which also helps improve their academic retention. On the other hand, self-efficacy is an important self-regulatory variable [17]. The study found that students with higher levels of self-efficacy were better able to adapt and solve problems in online learning,

leading to higher levels of academic retention. This shows that the higher the students' self-efficacy is, the more confident they are about online learning and self-improvement. This may be due to the fact that teachers are mainly responsible for tasks such as tutoring and helping students complete homework in fully online learning; while teachers on online teaching platforms do not interfere with students' online learning process. This may be due to the relatively little interaction between teachers and students, and the inability to give feedback and guide students in a timely manner. Therefore, schools can improve student engagement and academic retention by increasing teacher-student interaction [18].
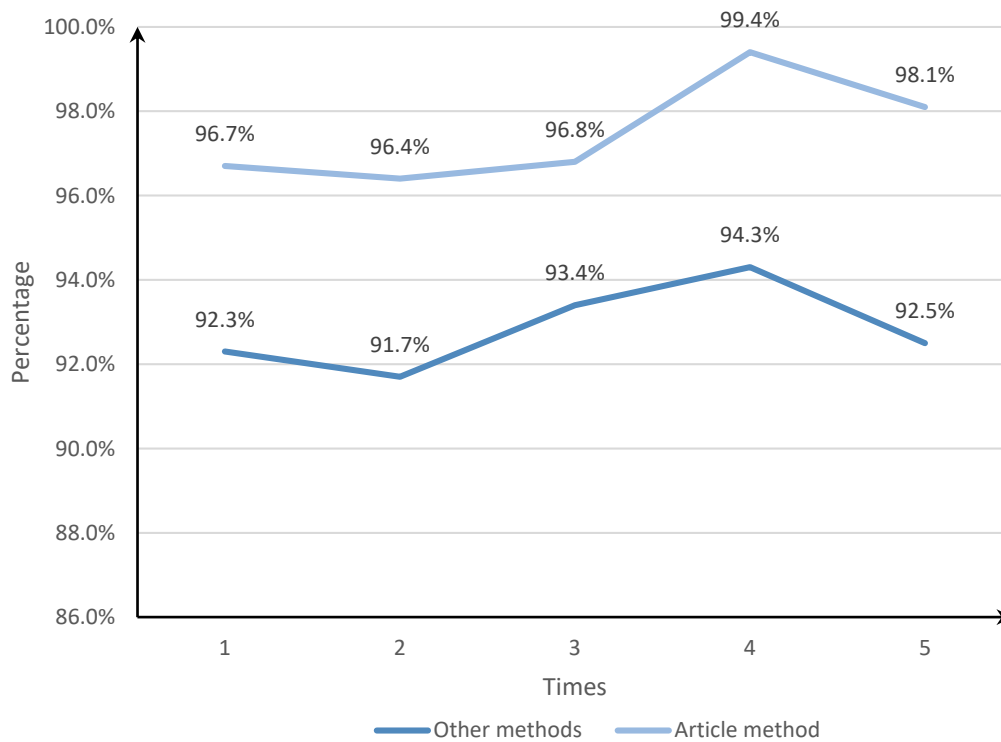

Figure 3: Academic retention comparison test

This may be because in a fully online learning environment, teachers are mainly responsible for guiding and helping students complete tasks such as homework; while in traditional classrooms, teachers need to consider how to better organize teaching activities and how to motivate students to participate in classroom activities. Therefore, teachers may not be able to have a direct impact on student engagement and academic retention [19]. At the same time, because the richness of network resources in a fully online learning environment is much higher than the variety of resources available in a traditional classroom teaching environment, the influence of teachers on student engagement and academic retention is also relatively small.

This suggests that students with higher self-efficacy are more able to self-regulate the relationship between their participation in online learning and academic retention. This is because students with higher self-efficacy are more inclined to use various effective means to improve their participation and academic retention in online learning; it also indicates that in a fully online learning environment, teachers should guide and encourage students to actively participate in teaching activities to improve their participation and academic retention [20]. This may be due to the fact that in a fully online learning environment, teachers need to interact and communicate with students to keep abreast of the problems they encounter in the learning process; while in traditional classroom teaching environments, teachers are usually only responsible for guiding and helping

students complete assignments and other tasks.

6. Conclusions

With the development of the times, online education is developing more and more rapidly, and the number of students studying online is also increasing. However, in this general environment, how to allow students to better participate in the online learning process and effectively improve students' academic retention is a common concern of many online educators and learners. Using a structural equation modeling (SEM) approach, this study investigated the impact of student participation in a fully online learning environment on academic retention with 500 undergraduate students at a university. The results of the study show that in a fully online learning environment, student engagement is positively correlated with academic retention, that is, the higher the engagement is, the higher the academic retention is; teacher engagement had no significant effect on student engagement, but had a greater effect on academic retention. This also provides useful enlightenment for school teaching administrators. This shows that school teaching managers should pay full attention to the role of teachers in the process of students participating in online learning. Teacher engagement and academic retention can be improved by providing teachers with training opportunities, organizing teacher training, etc.

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