

Retraction

Retracted: Massive Open Online Course Fast Adaptable Computer Engineering Education Model

Complexity

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

- [1] X. Liu, F. Gao, and Q. Jiao, "Massive Open Online Course Fast Adaptable Computer Engineering Education Model," *Complexity*, vol. 2021, Article ID 5934488, 11 pages, 2021.

Research Article

Massive Open Online Course Fast Adaptable Computer Engineering Education Model

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Massive Open Online Course (MOOC) is a new online education model that provides new opportunities and challenges for the development and reform of teaching in colleges and universities. This paper first builds a MOOC-based model of influencing factors of blended learning adaptability. Through investigation and research, it is found that the six influencing factors all have different ways and different degrees of influence on learning adaptability. Among them, learning motivation has a direct and significant impact on learning adaptability, and learning self-efficacy not only has a direct and significant impact on learning adaptability but also has an indirect impact on learning adaptability through learning motivation. Teacher teaching has indirect effects on learning adaptability through learning self-efficacy, learning motivation, and learning support. Learning support not only has a direct and significant impact on learning adaptability but also has an indirect impact on learning adaptability through learning motivation. MOOC platform has a direct and significant impact on learning adaptability. The quality of course content has a direct and significant impact on learning adaptability through the MOOC platform and learning motivation. The creative results of this research are mainly embodied in the combination of theory and practice, exploring and forming related results based on MOOC-based college students' learning adaptability. According to the MOOC-based learning-adaptive intervention model, teaching practice is carried out to verify the effect of the intervention model from two aspects of student procedural performance and result performance. Finally, in view of the problems existing in traditional computer teaching in colleges and universities, combined with the design ideas and basic characteristics of MOOC, the teaching mode reform of computer courses is analyzed and discussed, and a MOOC-based computer engineering education teaching mode is proposed.

1. Introduction

With the rapid development of global informatization construction, human society is about to enter the post-IT era [1], and the quality demands of various industries in society for IT talents are also increasing. Exploring and practicing the reform of education models and teaching methods and cultivating innovative Internet reserve talents have become the primary problem that needs to be solved urgently in computer professional education in colleges and universities. At present, most computer courses in domestic colleges and universities adopt the traditional teaching model with teacher teaching as the main part and student participation

as the supplement. This causes students to only accept the knowledge taught by teachers in one direction, which makes students not active in learning and affects student innovation. Ability training, a kind of training method, can no longer meet the society's needs for the quality of computer professionals. In view of the shortcomings of the traditional education model, many educators have actively explored the teaching reform of computer courses and proposed improved teaching models, flipped classroom, and cloud computing-assisted teaching. The main purpose is to change the teaching perspective and stimulate students. Students' active learning can effectively improve the efficiency of teaching MOOC (Massive Open Online Course) is a new

education model that has emerged in recent years. It is a product of the combination of the modern Internet and advanced education technology. It is easy to use, low-cost, or even free, covers a wide range of people, and supports the advantages of autonomous learning and abundant learning resources [2]. The MOOC has completely changed the educational concepts and teaching methods of the traditional classroom. It marks that the process of education informatization has entered a new stage of development. The MOOC model provides new ideas for the reform and innovation of computer teaching in colleges and universities.

MOOC originated from the online open courses of well-known universities and was first proposed by Canadian scholars Dave Cormier and Bryan Alexander [3]. Subsequently, some world-renowned universities in the United States cooperated with MOOC providers to establish an open learning platform through the Internet to provide learners with free online course education, which has attracted widespread attention from the international community and the education community. The course has attracted a large number of students from all over the world. Based on the MOOC platform, learners can conduct collaborative learning through blogs, forums, and other online resources for specific topics of interest [4]. The rise of MOOC has brought unprecedented changes to global higher education, and it has also had a profound impact on higher education in China. Different from the teaching model of traditional courses, MOOC reconstructs the teaching relationship, transforming the teaching model centered on the teacher to the teaching model centered on the learner. The curriculum adopts the miniaturized design of knowledge units and the network of teaching evaluation. Teaching concepts such as management and management fundamentally play the main role of students in learning [5]. Unlike previous online learning and online education courses, MOOC integrates a large number of Internet tools such as online learning, social networking, and mobile Internet, which can achieve real-time communication and interaction in the teaching process. Due to the limitations of teaching resources and experimental environment, the interaction and collaboration between teachers and students are very limited, which directly affects the effect of knowledge transfer. In response to these problems, learning from the advantages of the MOOC teaching model, this paper will research and explore the design methods of the teaching mode of computer courses in colleges and universities. First, through literature research, investigation research, action research, and other methods, we define the influencing factors of college students' learning adaptability in MOOC-based mixed teaching, sort out the various influencing factors, and design intervention models to effectively improve the learning adaptability of college students. Then, we improve the adaptability of the MOOC-based blended learning of college students, formulate scientific, systematic, and complete strategies for them to learn more efficiently, strive to overcome the difficulties encountered in the learning process, and optimize the learning effect. Finally, it provides effective ideas for teachers who develop MOOC-based blended learning to

further improve corresponding teaching programs and improve teaching quality. The research results can provide reference for designers of MOOC-based blended learning to design more high-quality course content and resources.

2. MOOC Learning Fast Adaptability

According to the above research results, it can be seen that adaptation is essentially a dynamic adjustment process of an individual to his inner psychology and outer behavior. Through analysis, this research believes that adaptation specifically refers to the psychological and behavioral process in which individuals maintain a dynamic balance with the environment through positive self-adjustment (internal psychology and external behavior) according to changes in their internal psychology and external environment [6]. It can be said that as individuals grow up, they need constant adaptation. Adaptation consists of three basic elements: individual, environment, and change. These three parts influence each other. The environment puts forward natural and social requirements for the individual. At the same time, the environment is the source of individual self-realization and self-development; change not only refers to the individual changing himself to adapt to the needs of the environment but also includes the individual being active according to his needs. To transform the environment, the purpose of adaptation is to maintain or promote the dynamic balance between the subject and the internal and external environment, so as to promote the harmonious development of body and mind.

In the field of educational psychology, there is a specific concept of learning adaptability. As a key topic in educational psychology, scholars have defined the concept of learning adaptability from different perspectives [7]. In foreign countries, scholars often describe the English name of learning adaptability as academic adjustment, academic adaptability, learning adaptability, academic adaptation, and so on. Specifically, it mainly defines learning adaptability as an ability and points out that learning adaptability is closely related to the learning effect of students. For example, American scholars Voronina and Moroz [8] believe that learning adaptability refers to an individual's positive attitude towards establishing learning goals, completing academic tasks, and the effectiveness of efforts made to meet these needs and adapt to the learning environment. Ramírez et al. [9] pointed out that learning adaptability not only involves students' potential for academic success but also includes students' ability to adjust to their own psychological, emotional, and behavioral factors. Scholar Kose [10] believes that learning adaptability refers to an individual's tendency to overcome and surpass obstacles in the learning situation, which directly affects the learning effect of students. In addition, some scholars have defined the concept of learning adaptation. For example, Johnson et al. [11] pointed out that learning adaptation is the ability to adapt to changes in the environment, and it is an individual who actively adjusts himself according to changes in the environment and his own learning needs to achieve a psychological and behavioral process that balances with the environment.

Based on the above enlightenment, regarding the connotation of learning adaptability and comprehensive understanding of adaptability and adaptability, this research believes that learning adaptability is the basic adaptability formed by students in the process of interaction with the learning environment. Specifically, in the learning process, students take the initiative to make active adjustments (internal psychology and external behavior) according to changes in their internal psychological activities and external learning environment, as well as their own development needs, so as to maintain a dynamic balance with the environment and overcome difficulties [12]. Learning adaptation does not refer to students' passive "adaptation" to teaching methods and learning environment, but students actively improve their learning abilities during the learning process and achieve good learning results. The ultimate goal is to train students to continuously overcome learning difficulties. Continuous adjustment can promote the overall development of the body and mind. This research believes that students' learning is essentially a process of gradual construction of knowledge through continuous adaptation. Learning adaptability has its inherent psychological structure, psychological adjustment, development law, and operating mechanism. Generally, it needs to adapt to the breaking of the equilibrium state, the generation of learning needs, the role of learning incentives, and self-positive adjustment, and finally, a new state of balance with the environment is formed [12].

It needs to be emphasized that the MOOC-based learning adaptability is based on the definition of blended learning adaptability and further focuses on the learning environment, that is, the integration of the online MOOC environment and the offline environment. The MOOC-based blended learning adaptability is the basic adaptability formed by students in the process of interacting with the MOOC-based blended learning environment. The relationship among the elements of the MOOC teaching model is shown in Figure 1. Specifically, it refers to the ability of students to maintain dynamic balance with the internal and external environments through self-adjustment according to changes in their internal psychology and external MOOC-based learning environment during the learning process, overcome learning difficulties, and achieve good learning results.

2.1. The Design of Curriculum Teaching Resources. Course teaching resources include course syllabus, teaching videos, course handouts, and experimental projects, but teaching videos are the main carrier. In traditional classrooms and online courses, teachers often make course handouts and teaching videos in advance according to the prescribed teaching content of the course and then carry out teaching according to a fixed process [13]. The teaching videos of traditional courses are often used as a kind of teaching guidance materials, as a supplementary form of classroom teaching. Moreover, this kind of teaching mode is usually led by the teacher to dominate the entire teaching activities and grasp each teaching link. Students only passively participate in the

course learning, which leads to the low initiative and enthusiasm of students in learning, which affects the overall teaching effect of the course. The MOOC-based computer course teaching design will adopt a student-based microcourse teaching model. The design concept is to divide the course content into several knowledge modules. Students can actively control the pace of learning according to their own learning speed, thereby effectively improving learning efficiency. According to the teaching objectives of computer courses, the microcourse teaching model divides the teaching content of traditional courses into several knowledge modules. Each knowledge module includes teaching videos, classroom tests, course discussions, and homework required for the teaching process. In view of the dominant position of teaching videos in teaching resources, the microcourse teaching model will use microvideos as the main presentation carrier of teaching resources. The specific design method can be divided into three aspects: taking the theoretical knowledge points in the course chapters as the basic unit, the traditional teaching videos are divided into several microvideos, and the design time of each microvideo is generally about ten to fifteen minutes; each of the online test exercises of the corresponding knowledge module is embedded in the microvideo and can provide information feedback on the test results; students can only enter the next knowledge module after completing the learning of this knowledge module. Many knowledge points need to be verified and tested through specific practical operations. The use of microcourse teaching mode is more suitable for the teaching characteristics of computer courses.

2.2. The Design of Classroom Learning Interaction. The teaching mode design of traditional online courses is relatively fixed and lacks a learning evaluation mechanism for teachers and students to participate extensively in interactive communication [14]. The MOOC-based computer course teaching model combines the advantages of traditional classrooms and online courses, reflects the teaching communication model of traditional classrooms to the greatest extent, and has the characteristics of online education that is more convenient and flexible than traditional classrooms. This new type of online teaching mode covers the whole process of teaching activities and can provide online tests and discussions for course teaching. In the computer course teaching model that adopts microcourse design, the online test questions embedded in each knowledge module can be in the form of single-choice questions, multiple-choice questions, and microprogram design questions. After students complete the online test exercises in the classroom, the system will automatically give feedback on the test results, and the test process can automatically switch between the test questions and the supporting platform. For subjective problems in the learning process, students can communicate in real time through social networking tools such as forums and instant messaging. This kind of interactive communication method helps to improve students' enthusiasm for participating in learning and can effectively improve the teaching effect of the course, which is in line with the basic characteristics of computer course teaching.

2.3. The Design of Course Evaluation. At present, university computer professional courses generally complete the teaching assessment and evaluation from two aspects: usual grades and final grades. The usual grades mainly include classroom attendance, program verification, and program design; final grades are mainly based on examination paper assessment and machine assessment [15]. However, these assessment methods do not fully reflect the students' mastery of curriculum knowledge. In order to give full play to the guiding and motivating role of assessment and evaluation, the MOOC-based computer curriculum teaching model uses a combination of teacher evaluation, peer evaluation, and self-evaluation to comprehensively evaluate students' knowledge and ability levels. The specific design principle is that teacher evaluation is based on students' course program design and actual project assessment; peer evaluation is based on the flipped classroom thinking method, and students use role switching to evaluate each other anonymously, while self-evaluation is based on students' evaluation of the entire course. The summary and generalization of knowledge are submitted to the course platform in the form of a course report as a staged evaluation of professional course learning. Teachers can reasonably set different proportions of the above three assessment methods according to the talent training goals of different professional courses, so as to obtain a comprehensive evaluation of the courses learned by the students.

2.4. Analysis of Student Learning Behavior. From the design of classroom learning interaction, it can be seen that the teaching interaction of computer professional courses is mainly based on social networking platforms. Students will generate a large amount of behavioral data in the process of learning interaction. These data will reflect the existence of students in the learning process. Based on cloud computing and data mining technology, the corresponding data model is established according to the collected student behavior data, and the available information is extracted by using the corresponding data mining algorithm for analysis and processing. Based on the extracted information, teachers can make reasonable improvements to the teaching methods, teaching resources, and teaching decisions of the course, provide students with a personalized, diversified, and humanized learning environment, and effectively solve the problem of differences in students' learning.

2.5. The Design of Experimental Teaching Environment. Computer practice teaching is an important link in the teaching of computer professional courses, and it is also an important means to improve the quality of application-oriented personnel training. Due to the limitation of teaching resources, many domestic colleges and universities do not have perfect experimental teaching equipment and modern experimental environment, which affects the effect of computer practice teaching, resulting in serious shortage of students' practical ability, design ability, and innovation ability. Based on the virtualization technology of cloud computing, establish an interactive and personalized virtual

experimental teaching platform. Make full use of the computing, storage, and network resources provided by the cloud platform to integrate teaching, management, and services to establish virtual practical teaching classrooms [16]. According to the needs of computer professional course teaching, integrate various teaching resources on the cloud platform, completely remove the space and time constraints of traditional course teaching, and provide diversified, multiangle, and multilevel distributed teaching for teacher teaching and student learning. The environment provides platform support for innovative teaching models and optimizing teaching resources.

In summary, based on the theoretical combing and interview results, the composition of factors affecting learning adaptability is further integrated. This research divides the influencing factors of MOOC-based blended learning adaptability into internal factors and external factors. Among them, internal influencing factors include learning motivation and learning self-efficacy, and external influencing factors include teacher teaching, learning support, MOOC platform, and course content quality. The composition and sources of factors affecting learning adaptability are shown in Figure 2.

3. MOOC-Based Learning Adaptability and Its Influencing Factors

3.1. Learning Attitude. Learning attitude refers to the students' affirmative or negative behavioral tendency or behavioral response to learning. According to the research results of modern psychology, learning attitudes can be divided into three components: cognition, emotion, and behavior. Emotional experience refers to the emotions and curiosity of students in the learning process. Cognitive level refers to the students' awareness of the importance of participating in the course of learning. Behavioral orientation refers to the behavioral performance of students participating in learning activities, including the behavioral performance of learning initiative and overcoming difficulties.

3.2. Self-Learning Ability. In the MOOC-based blended learning environment, students become the main body of learning, active explorers, and constructors, and teachers are regarded as instructors and facilitators. Learning has become an active and meaningful activity, and students have more autonomy. Therefore, a good self-learning ability becomes the key to ensuring students' learning effects. This decision-making includes the establishment of learning objectives, determination of learning content and learning methods, and monitoring and evaluation of the learning process and effects. This study divides autonomous learning capabilities into autonomously setting learning goals, autonomously choosing learning methods, and self-evaluation. Self-determining learning goals means that students set corresponding learning goals for themselves based on the overall goals of the course. Autonomous choice of learning methods means that students can choose corresponding learning

methods according to specific learning tasks and learning content. Self-evaluation means that students can make an objective evaluation of their own learning effects.

3.3. Learning to Communicate. Good communication and interaction, as an important feature of MOOC-based blended learning, is an important part of students' learning adaptation. The way of interaction includes the interaction between teachers and students, the interaction between students, and the interaction between students and teaching resources [17]. This study also adopted this classification method. Specifically, in this research, the interaction between students, teachers, and peers mainly includes online and offline two parts. Online is concentrated in the course-specific discussion area, and offline refers to the interaction during face-to-face instruction. The interaction between students and teaching resources mainly refers to students participating in answering pop-up questions in the video.

3.4. Learning Environment. The learning environment refers to the integration of various supporting conditions that promote student development. These supporting conditions mainly include resources, tools, teacher-student relationship, and teaching activities. Starting from the MOOC-based hybrid learning environment, this research defines the learning environment as a curriculum resource environment, specifically referring to learning materials in various media forms that convey curriculum information, including videos, PPT courseware, textbooks, and discussion areas. In the learning process of students, the utilization of the above resources has become an important part of students' learning adaptability.

3.5. Physical and Mental Health. Physical and mental health is also an important part of learning adaptability. Specifically, it refers to the physical and mental health of students in the learning process. Physical health refers to the physical fitness of the students themselves, such as whether the body allows a certain period of time to study in front of a computer or mobile phone. Mental health refers to the students' emotions, mentality, and other aspects.

3.6. Analysis of Learning Adaptability Factors Based on MOOC. The purpose of factor analysis is to explore the inherent dependencies between multiple variables while ensuring that as little information about the original variables as possible is lost. Starting from the correlation matrix of the original variables, find the truly relevant variables and classify the relevant variables into a category. Finally, several types of hypothetical variables are formed, and the correlation between different variables is very low. Each type of variable represents the "common factor," that is, the internal structure [18].

The general model of factor analysis is

$$Y = \begin{cases} y_1 = \lambda_{11}x_1 + \lambda_{12}x_2 + \cdots + \lambda_{1p}x_p + \varepsilon_1, \\ y_2 = \lambda_{21}x_1 + \lambda_{22}x_2 + \cdots + \lambda_{2p}x_p + \varepsilon_2, \\ \cdots, \\ y_m = \lambda_{m1}x_1 + \lambda_{m2}x_2 + \cdots + \lambda_{mp}x_p + \varepsilon_m. \end{cases} \quad (1)$$

In the formula, y_1, y_2, \dots, y_m are the standardized sample observation variables; $\lambda_{ij}, i = 1, 2, \dots, m, j = 1, 2, \dots, p$, is the factor loading; x_1, x_2, \dots, x_p are called the common factors; $\varepsilon_1, \varepsilon_2, \dots, \varepsilon_p$ are called the special factors.

Factor loading, $\lambda_{ij}, j = 1, 2, \dots, p$, is the characterization of linking measurable variables and common factors. The larger the absolute value of λ_{ij} , the more obvious the correlation between the common factor and the measurable variable y_i , so as to find the actual meaning of the common factor nothing. The common degree represents the ratio of the total variance expressed by the common factor to the original variable. Its expression is

$$\text{var} = \sum_{j=1}^p \lambda_{ij}^2. \quad (2)$$

The variance contribution rate of the common factor represents the expression effect of the factor on the total variance of all original variables. It is an indicator of the relative importance of the common factor. The larger the value, the greater the relative importance of the common factor. The sum of the squares of the factor loading and its expression is

$$\text{var}(\text{con}) = \sum_{i=1}^m \lambda_{ij}^2. \quad (3)$$

Only if the original variables have a strong correlation can the factor analysis be performed. If the original variables are completely uncorrelated or have little correlation, there will be no overlapping information between the variables, and no common factor with the common characteristics of the original variables can be proposed [19].

The simplest way to detect whether the original variables are suitable for factor analysis is to calculate the correlation coefficient matrix: if most of the correlation coefficients are less than 0.3, then most of the variables are weakly correlated, and if they fail the test, factor analysis is inappropriate. In addition, the Bartlett ball test starts from the variable correlation coefficient matrix; the null hypothesis H_0 's correlation coefficient matrix is an identity matrix. Calculate the statistics of the Bartlett spherical test according to the determinant of the sample correlation coefficient matrix. The matrix is similar to the chi-square distribution. If the chi-square value of the test statistic is relatively large and the corresponding accompanying value (P -value) is less than the predetermined significant level α , reject the null hypothesis, indicating that it is suitable for factor analysis. On the contrary, factor analysis is not appropriate. And there is KMO (Kaiser-Meyer-Olkin) test [5, 20–26]. Its mathematical expression is

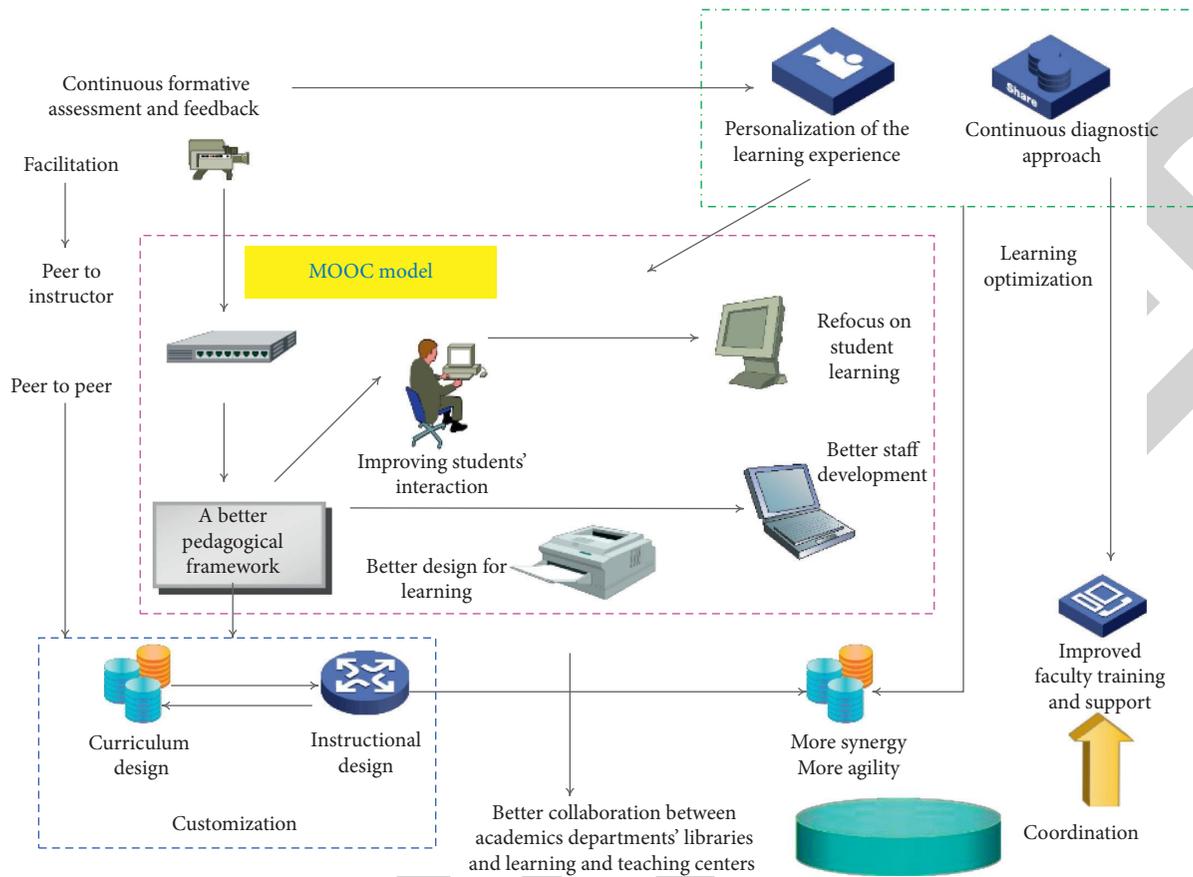


FIGURE 1: The relationship among the elements of the MOOC teaching model.

$$R = \sum_{i=1}^m \sum_{j=1}^p r_{ij}^2, \quad (4)$$

$$P = R + \sum_{i=1}^m \sum_{j=1}^p \varepsilon_{ij}^2,$$

$$KMO = \frac{R}{P} = \frac{R}{R + \sum_{i=1}^m \sum_{j=1}^p \varepsilon_{ij}^2}.$$

Kasier pointed out the criteria for factor analysis in KMO test: $KMO > 0.9$ is very suitable; $0.8 < KMO < 0.9$ is suitable; $0.7 < KMO < 0.8$ is general; $0.5 < KMO < 0.7$ is not suitable; and $KMO < 0.5$ is not suitable.

4. Results and Analysis

The resultant data mainly include content such as learning adaptability level test, unit knowledge test scores, reflection level, student interviews, and teacher interviews.

4.1. Analysis of Changes in Students' Learning Adaptability Level. This part uses the learning adaptability scale developed by the research to test the changes of students' learning adaptability level after adopting the computer engineering education model. Specifically, the paired sample *T*-test

method is used, and the test values are shown in Table 1. Comparing the scores of the experimental students in the pretest and posttest, the test results are shown in Figures 3 and 4.

It can be seen from the above table that the average pretest and posttest of the overall level of learning adaptability are 3.53 and 3.54, respectively, and the significance is 0.024. The test result is significant, indicating that the students' learning adaptability has been significantly improved after the intervention. On this basis, we can further analyze the changes in each dimension. The average values of the pretest and posttest of learning attitude were 3.14 and 3.62, and the significance was $0.142 > 0.05$. The test result was not significant, indicating that, after the intervention, the students' learning attitude has improved to a certain extent. This shows that learning attitude is the inner psychological element of college students, and the improvement in this aspect is a gradual process. The average values of pretest and posttest of the learning task are 3.52 and 3.68, respectively, and the significance is $0.014 < 0.05$. The test result is significant, indicating that, after the intervention, the students' learning tasks have been significantly improved. The average pretest and posttest of autonomous learning ability were 3.43 and 3.63, respectively, and the significance was $0.054 > 0.05$. The test result was not significant, indicating that, after the intervention, the students' autonomous learning ability has improved, but the effect is not significant. This shows that

Influencing factors of learning adaptability

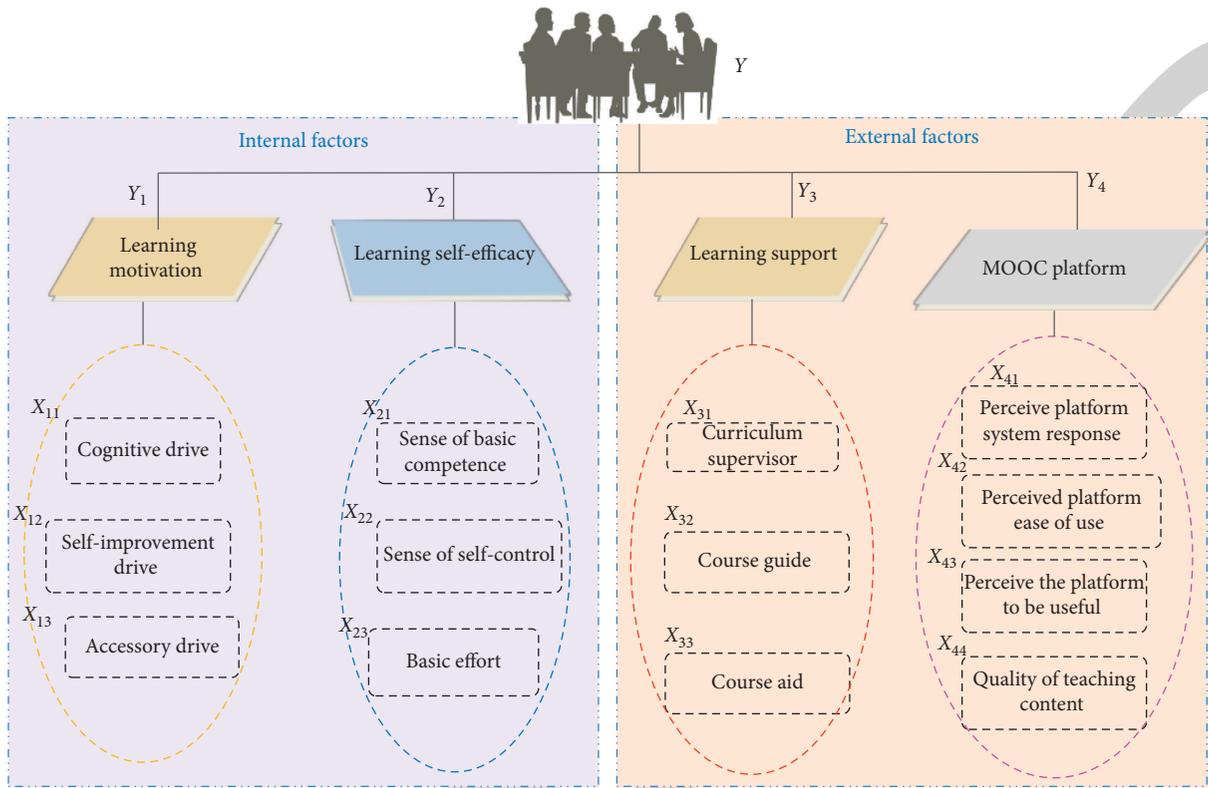


FIGURE 2: The composition of factors influencing learning adaptability based on the combination of theoretical combing and interviews.

TABLE 1: Scaling scale.

Variable	T-test	P value
Learning attitude	-1.245	0.142
Assignment	-2.323	0.014
Self-learning ability	-1.483	0.054
Learning exchange	-2.251	0.041
Learning environment	-2.148	0.001
Physical and mental health	-1.483	0.241

autonomous learning ability is a specific category of students' ability, and the improvement of students in this area is also a gradual process. The average values of the pretest and posttest of learning communication are 3.42 and 3.76, respectively, and the significance is $0.041 < 0.05$. The test result is significant, indicating that, after the intervention, the students' learning communication has been significantly improved. The average values of the pretest and posttest of the learning environment are 3.57 and 3.79, respectively, and the significance is $0.001 < 0.05$. The test result is significant, indicating that the students' learning environment has been significantly improved after the intervention. The average values of the pretest and posttest of physical and mental health are 3.69 and 3.78, respectively, and the significance is $0.241 > 0.05$. The test result is not significant, indicating that, after the intervention, the physical and mental health of students has improved to a certain extent, but the effect is not significant.

4.2. Analysis of Changes in Students' Learning Adaptability Level. Unit knowledge test questions are used to examine students' mastery of the knowledge they have learned. And these questions are the key to measuring students' learning adaptability and learning quality. In the specific calculation, the test questions are scored in the form of a hundred-point system, and then the average value of each item is taken. Figure 5 shows the test results of no intervention and the first round of intervention.

According to the data in this table, the following conclusions can be drawn: First, after the first round of intervention, the total score has been increased from 79.22 points to 83.34 points. Second, after the first round of intervention, the scores of each knowledge type have been improved to a certain extent. Third, among the four knowledge types, students have relatively good mastery of factual knowledge and conceptual knowledge, with higher scores. After that, knowledge is applied. In contrast, students have a poor grasp

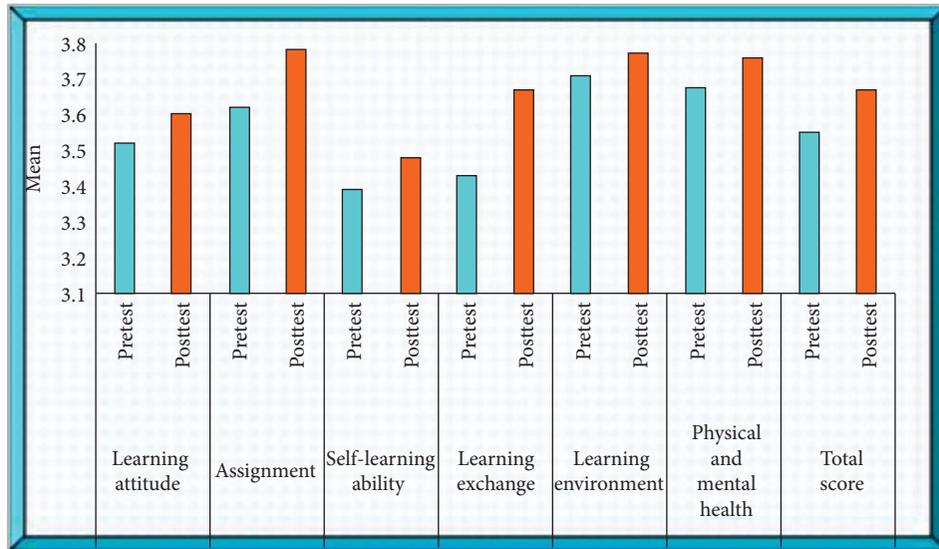


FIGURE 3: Changes in the average level of students’ learning adaptability based on the computer engineering education model.

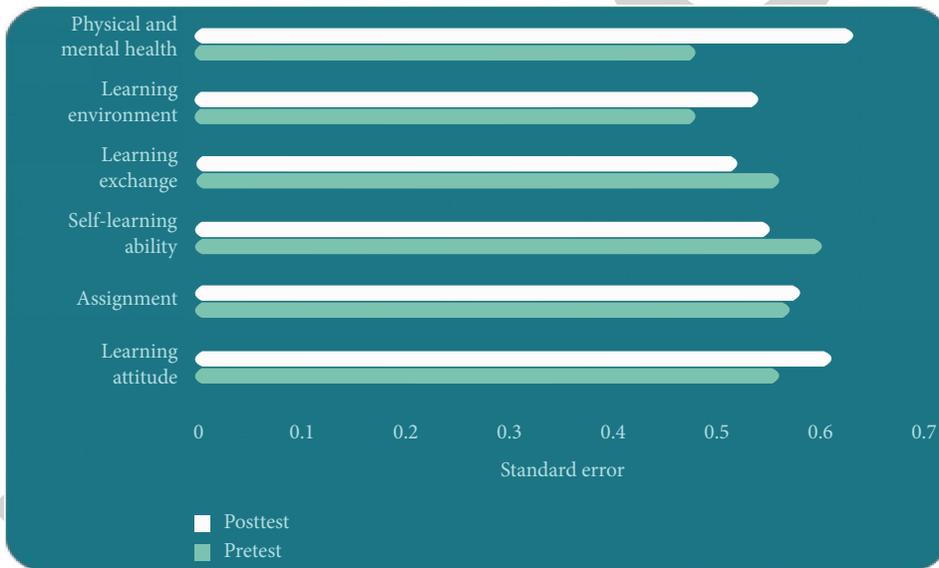


FIGURE 4: Changes in the standard deviation of students’ learning adaptability based on the computer engineering education model.

of migratory knowledge, with low scores, and the degree of improvement is not very obvious. This also shows that students are weak in applying the knowledge they have learned to solve new problems and lack the awareness and ability to draw inferences from one another. This aspect needs to be gradually improved.

4.3. Level of Reflection. Based on the reflection level coding table, this research analyzes and quantifies the content of reflection diaries written by students to determine the level of reflection of students. This part mainly includes two contents. Firstly, we need to calculate the average score of the students’ reflection level without intervention. Secondly, we calculate the percentage of the total number of people with different reflection levels without intervention and the first

round of intervention. In the last step, we further analyze the characteristics of changes in students’ reflection levels.

Figure 6 shows the average level of reflection of students in the nonintervention and the first round of intervention. It can be seen from the table that the overall reflection level of students is above the middle level. Further analysis, after a round of intervention, the students’ level of reflection has improved.

4.4. Overall Satisfaction of Teaching Mode. Regarding the overall satisfaction of the teaching model, the questionnaire surveyed three aspects: improving learning efficiency, improving self-learning ability, and promoting knowledge understanding and deepening, as shown in Figure 7. For “you like the teaching model used in this course,” 52.43% of

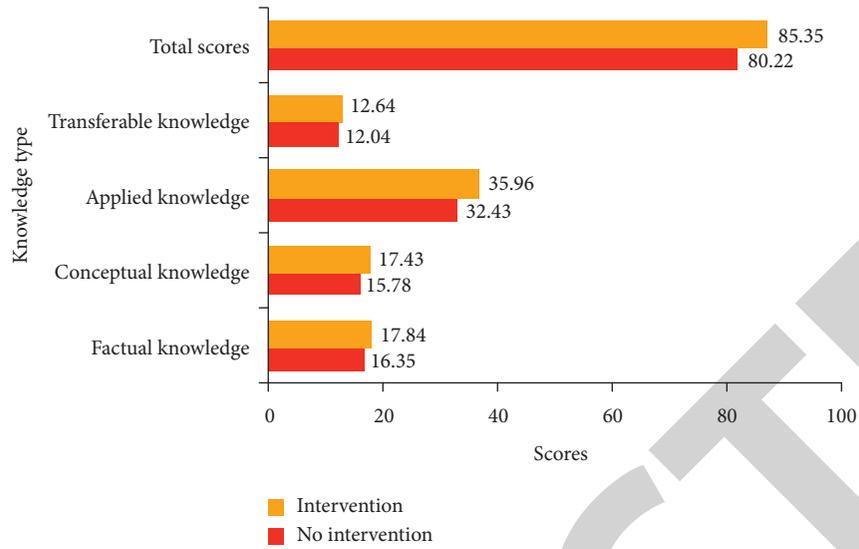


FIGURE 5: Unit knowledge test results without intervention and intervention.

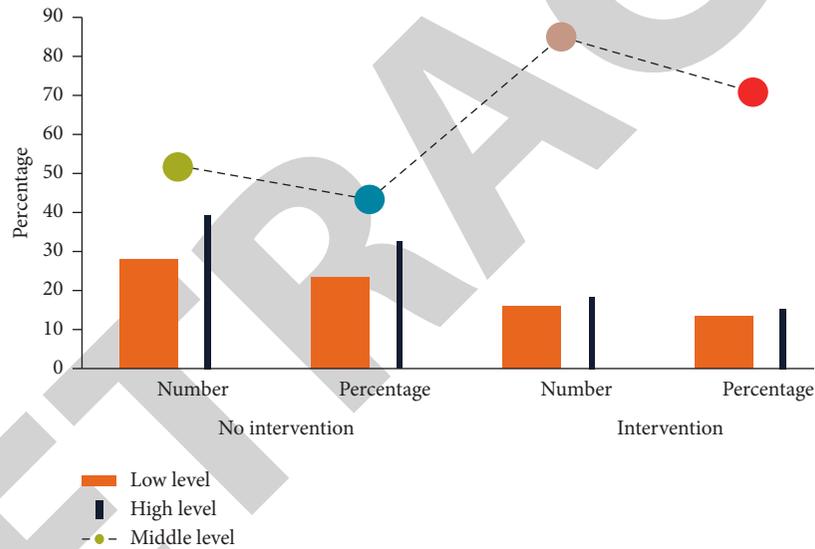


FIGURE 6: Percentage of people with no intervention and reflection level with intervention.

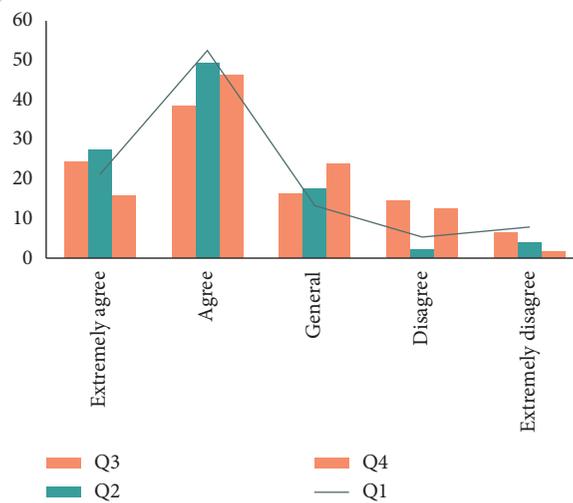


FIGURE 7: The statistical table of the overall satisfaction survey questionnaire of teaching mode.

students agreed, but only 5.32% disagreed, which shows that the teaching mode is very popular among students. From the “this model can improve learning efficiency,” 76.59% of students agreed, while only 2.14% disagreed. From the perspective of “this model can improve the ability of autonomous learning,” 62.78% of the students agreed, while 16.34% disagreed, and 14.53% of them strongly disagreed. This shows that the factors that affect students’ autonomous learning ability also include teaching. In addition to resources, teaching environment, teaching design, and teaching mode, it is also related to itself and other factors. Regarding “this model can better promote the understanding and deepening of knowledge,” 72.34% of the students agreed, while 12.49% disagreed. It can be seen that the students’ overall satisfaction with this model is relatively high.

5. Conclusion

At present, MOOC-based blended learning has become an important situation in the reform of college education and teaching. Based on the determination of the adaptability of MOOC-based blended learning and the basic composition of influencing factors, this research uses project analysis and exploratory factors. The method of analysis and confirmatory factor analysis has compiled a MOOC-based scale of learning adaptability and its influencing factors to further determine the composition. Among them, learning motivation has a direct and significant impact on learning adaptability, and learning self-efficacy not only has a direct and significant impact on learning adaptability but also has an indirect impact on learning adaptability through learning motivation. Teacher teaching has indirect effects on learning adaptability through learning self-efficacy, learning motivation, and learning support. Learning support not only has a direct and significant impact on learning adaptability but also has an indirect impact on learning adaptability through learning motivation. MOOC platform has a direct and significant impact on learning adaptability. The quality of course content has a direct and significant impact on learning adaptability through the MOOC platform and learning motivation. On the basis of constructing the influencing factors of learning adaptability, this research designed a MOOC-based computer course teaching model based on relevant research and theoretical foundation inspiration, according to the relationship between learning adaptability influencing factors. Finally, experiments verify that the model can expand the use of high-quality educational resources, realize the opening and sharing of educational resources, make up for the shortcomings of traditional classroom teaching, and improve teaching and learning effects.

Data Availability

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Consent

Informed consent was obtained from all individual participants included in the study references.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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