

# Evaluation on the Construction of the Diagnosis and Improvement Model of College Classroom Teaching Based on Learning Evaluation Technology

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**Abstract:** School is one of the main positions to implement quality education. School teaching is the most important and basic part of the whole education cause, which is related to the development of students in their whole life. However, many colleges have many problems in carrying out teaching activities. College students generally lack the ability of independent thinking and judgment, especially in the aspect of logical thinking. As a result, they tend to fall into a fixed thinking pattern and their own quality cannot be fully developed. Therefore, people must pay attention to and strive to address the issues existing in school education. Only in this way can people ensure that the trained people can comprehensively improve the quality of talent training. Learning analysis is a new teaching mode. This way not only enables learners to grasp knowledge more intuitively, but also applies theoretical knowledge to practical activities, providing students with richer and more vivid teaching content and more flexible and convenient teaching system. This paper discussed some problems in college teaching at the present stage, expounded the construction of classroom teaching mode based on learning analysis technology in detail from the theoretical point of view, put forward new classroom teaching diagnosis methods and improvement strategies, and laid a solid foundation for improving college students' learning achievements and cultivating innovative talents. By comparing the classroom teaching system before and after the improvement based on learning analysis technology, it was proved that the optimized teaching method can greatly mobilize the enthusiasm of students. At the same time, it can improve the problems existing in the conventional teaching mode, enhance the learning effect, and improve the achievement of teaching objectives by about 12.84%. The teaching quality has been significantly improved. This research can not only help colleges and universities to carry out relevant curriculum education, but also promote the progress of modern society and provide important support for training high-quality talents.

**Keywords:** Learning Analysis Technique, College Classroom, Teaching Diagnosis, Teaching Improvement

## 1. Introduction

### 1.1 Evaluation Background of Classroom Teaching Improvement in Colleges

College education is increasingly receiving the attention and support of all sectors of society. As a college with distinctive characteristics, its talents should not only have solid professional knowledge, but also have good cultural quality and innovation ability. In this environment, it is necessary to strengthen the construction of college students' professional ability, improve teaching quality, and achieve talent training objectives. At present, there are some problems in the teaching process of higher vocational colleges. Therefore, it is necessary to actively explore and reform new teaching methods to better meet the social needs and improve the quality of talent cultivation.

### 1.2 Importance of Classroom Teaching Reform in Colleges

#### 1.2.1 Helping the Overall Growth of Students and the Improvement of Learning Ability

Only through independent exploration, cooperation and communication can students effectively acquire knowledge and carry out creative thinking, and this active exploration is based on correct

cognition. Therefore, the key to efficient classroom is to let students fully experience the close relationship between science and life, so as to stimulate their interest and thirst for knowledge and make them become a real problem solver. Creating a relaxed and harmonious classroom atmosphere and helping students actively participate in the process of knowledge acquisition in the classroom can not only effectively improve students' independent inquiry spirit and practical innovation ability, but also cultivate their good psychological quality and lay a solid foundation for future success.

### ***1.2.2 Helping to Teachers' Professional Growth and Enhancing Teaching Vitality***

The professional development of teachers is a noble mission entrusted to educators by modern society. Teachers would change from conventional knowledge imparting to lifelong learning, thus forming a new teaching style. Through classroom teaching activities, people can not only improve professional ability and constantly develop themselves, realize personal career ideal, but also promote mutual understanding, communication and progress between teachers and students, which would help teachers better serve students, stimulate their subjective initiative, cultivate good teachers' moral sentiment, and make the teaching process more vivid.

### ***1.2.3 Helping to Improve the Image and Social Reputation of the School***

The teaching quality of a school is an important indicator that reflects the characteristics and comprehensive strength of a school. It includes not only the strength of teachers and construction of teaching facilities and management level, but also the quality of the teaching staff and their work results. The reform of classroom teaching can help teachers update their ideas, innovate teaching methods, and optimize teaching content. It also enriches teaching methods, improves teaching management measures, promotes the further improvement of school education quality and level, and finally achieves the goal of improving school conditions and establishing a good image of the school.

## **2. Progress and Trend of Classroom Learning Evaluation in Colleges**

People's quality of life has also been greatly improved, but at the same time, people also see that there are many disharmonious factors in the society. Among them, the difficulty of students' employment and other problems restrict the overall development of the school. The main reason for such problems is that the current school education generally pays attention to the curriculum and teaching reform, but ignores the teaching methods and means, resulting in low learning efficiency of students and seriously affecting the realization of talent training objectives. With the continuous changes of the times, the society would also have higher and higher requirements for talents.

Classroom teaching is the most frequent and effective way for teacher-student interaction. Many scholars have put forward a variety of researches on classroom teaching diagnosis and intervention methods. Metzger Kelsey J introduced the development of teaching diagnosis tools, and realized the development and design of an iterative diagnosis and intervention program, aiming at eliciting and quantitatively describing students' cognition, influence and learning habits in all aspects, so as to improve their ability to communicate effectively in the classroom [1]. Clausen Jon M described how the leaders of three teacher education institutions used the teaching leadership diagnostic tools of technology, teaching and content knowledge in the design, development and implementation of technology-rich programs, and proved their leadership ability to analyze, evaluate, manage and improve their performance of students' learning process [2]. Bowe Melissa assessed the basic conditions that pre-school support professionals should have, mainly to understand the knowledge and skills required for education at all stages of early childhood development, master the necessary observation, thinking and operating skills, and guide students to carry out daily teaching activities [3]. Hardy Ilonca studied adaptive teaching in learning and teaching research, promoted students to actively participate in teaching activities by creating situations and problems, and emphasized that students constantly adjust their psychological state and behavior mode in the process of independent inquiry to achieve the goal of optimizing teaching effect and improving teaching quality [4]. Heitzman Nicole put forward different types of teaching support, and investigated the possible supplementary role, regulatory factors, individual learning prerequisites, cognitive emotion and situational factors that directly represent information in these environments [5]. Sivarajah Rebecca T has reformed the conventional teaching mode based on innovative teaching methods and teaching practices, designed teaching content using learning analysis methods, and enabled students to fully grasp knowledge and improve classroom efficiency by combining students' independent inquiry and teacher guidance [6]. Scientific diagnosis of classroom teaching helps to find problems and take measures to solve them, and also provides valuable information support for schools.

Learning analysis can help schools find problems and provide solutions. Many scholars have studied the application of learning analysis in education and teaching from different perspectives. Lu Owen HT applied learning analysis and education big data methods to predict students' final academic performance in the mixed calculus course at an early stage, identified online factors and conventional factors that affect students' academic performance, and proved that the mixed data set combining online and conventional key factors has the highest prediction performance [7]. Lewis Catherine E implemented the flipped classroom method to promote students' active learning, so that teachers can better become participants and guides in the teaching process, improve students' awareness and enthusiasm of mastering knowledge in independent inquiry, and improve their ability [8]. Chernikova Olga, based on the learning framework of learning analysis and simulation, determined whether the students have achieved the expected goals by evaluating the learning results, effectively helped teachers understand the problems students encounter in the learning process, and provided guidance for subsequent teaching [9].

Based on educational data mining and learning analysis, Zhang Jia-Hua investigated students' login behavior, resource utilization, test, interaction behavior and learning performance, mined users' interest points through data analysis, and designed personalized teaching services [10]. Bao Haogang assessed the effectiveness of a knowledge-based and behavior-based learning analysis dashboard system in supporting teachers to diagnose and intervene in learning difficulties, and improved learning effects by self-evaluating learners in different situations and adjusting their learning strategies according to the evaluation results [11]. De Hoyos Rafael used learning analysis to test the teaching method, so that students can learn professional knowledge in real experimental situations, obtain rich and valuable knowledge through simulation and personal experience, and help them use the knowledge to solve practical problems [12]. Learning analysis technology has strong flexibility and practicability, and can meet the needs of various teaching environments. It has become an indispensable means of teaching reform and improving teaching quality.

This paper, based on the analysis of the shortcomings of existing teaching models, constructs a new classroom model based on intelligent digital education with learning analysis technology as the core. This model promotes the realization of teacher-student interaction through the combination of creating situations and stimulating interests, the combination of teacher-student interaction and student cooperation, and the diversification of evaluation methods, and guides students to actively participate in teaching activities. The teaching mode based on learning analysis can make the teaching process more efficient. It can also effectively improve the depth of teachers' understanding of the teaching content, and enhance the level of teachers' own ability, thus improving the teaching quality. It is of great significance to apply the teaching reform based on learning analysis to college classroom teaching.

### **3. Classroom Teaching Diagnosis and Improvement Process Based on Learning Evaluation**

#### ***3.1 Constructivism Learning Theory in Universities and Its Enlightenment***

Schools are the cradle of cultivating qualified talents. Students who grow up in this cradle must face various challenges. One of the most important and most difficult problems in education and teaching is the students' mastery of knowledge and skills and the level of ability development, which includes the quality of thinking, language ability, thinking ability, innovation ability and other aspects. As a teacher, how to effectively guide students to actively participate in the learning process and improve their learning effect is a very worthy research topic. Constructivism is the product of such a trend. It combines conventional theory with practice and provides a new way for people to explore. It also enlightens educators to start from reality and guide students to conduct independent inquiry learning with innovative spirit.

First of all, constructivism believes that the knowledge and skills received by students in the classroom come from the experience imparted by teachers, so learners should be considered as a whole. This idea is a breakthrough in conventional teaching theory. It not only provides people with a new teaching model, but also enables people to make more effective use of limited time to improve teaching quality.

Secondly, constructivism also advocates "student-oriented", emphasizes the common development of teachers and students as the main line, and advocates the cultivation of a good spirit of cooperation, such as strengthening mutual assistance through group activities, giving full play to the mutual

cooperation ability of group members, creating new educational effects, and establishing a new teacher-student relationship of mutual respect, and mutual understanding and trust, which is also the direction that many educators are trying to explore and practice.

Thirdly, constructivism requires learners to have a certain sense of self-efficacy and achievement, and these emotions often directly affect their learning results. This learning behavior would also promote students to form positive personality traits. Therefore, teachers must guide students to learn self-regulation, self-management and harmony with others, so as to achieve the teaching purpose.

Finally, everyone has different personality characteristics. Only according to these differences can people better mobilize their enthusiasm, initiative and creativity.

### 3.2 Application of Learning Evaluation Technology in Teaching Class

Classroom teaching is a complex process that requires a lot of time to study and implement. Therefore, there must be a complete set of teaching diagnosis tools to support the dialogue between teachers and students and meet the needs of both parties for communication and discussion [13]. Learning analysis is an effective method of information collection, sorting and processing based on the knowledge and experience gained by learners in the classroom. It is mainly used to help teachers understand the actual situation of students and grasp what they are doing and how to solve these problems. The specific application is shown in Figure 1.

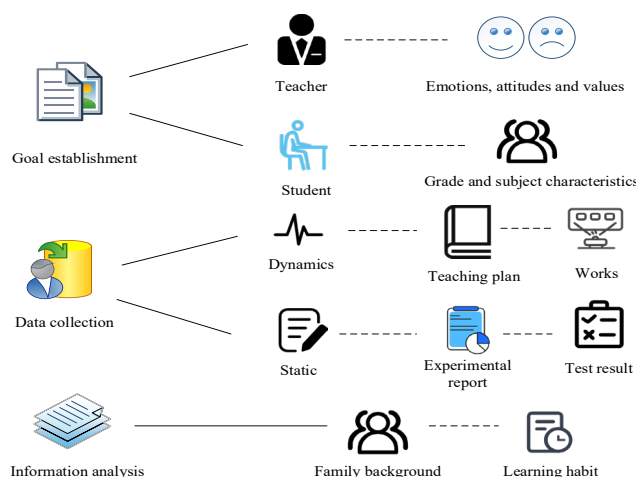


Figure 1: Application of learning analysis technology in the classroom

The first is goal establishment. It includes teachers' teaching objectives and students' learning objectives. Teaching objectives are the basis for guiding teachers to implement teaching activities. They are usually composed of teaching contents, teaching methods, teaching requirements and other contents, mainly embodied in knowledge and skills, processes and methods, and emotional attitudes and values. The learning objectives need to be determined according to the characteristics of different grades and disciplines, and the specific setting should also combine the students' own characteristics and acceptance ability to achieve the purpose of promoting the learning effect.

The second is data collection, which includes the acquisition of students' dynamic and static information. The dynamic information comes from the relevant materials taught by teachers in the classroom or other teachers' teaching records, such as classroom records, lesson plans, homework works, etc., which can be obtained through the network or other channels. The static information sources generally come from textbooks, teaching aids, experimental reports, test results, etc., and are supplemented by relevant information collected from schools, parents or society.

The third is information analysis, including students' family background, learning habits, innovation ability and learning achievements. Its role is to help students understand their strengths and weaknesses in a timely manner and formulate corresponding measures to correct them, so as to maintain their personality quality and good learning attitude and make them develop more healthily.

### 3.3 Classroom Teaching Diagnosis Evaluation Based on Learning Evaluation

Learning analysis is a new method, which can comprehensively evaluate the problems in the

teaching process. By applying learning analysis technology in teaching practice to carry out teaching work, it can effectively improve teaching quality and teaching effect, promote the coordinated development of students' knowledge and ability, and achieve the goal of efficient classroom construction. The classroom teaching diagnosis method based on this technology is shown in Figure 2.

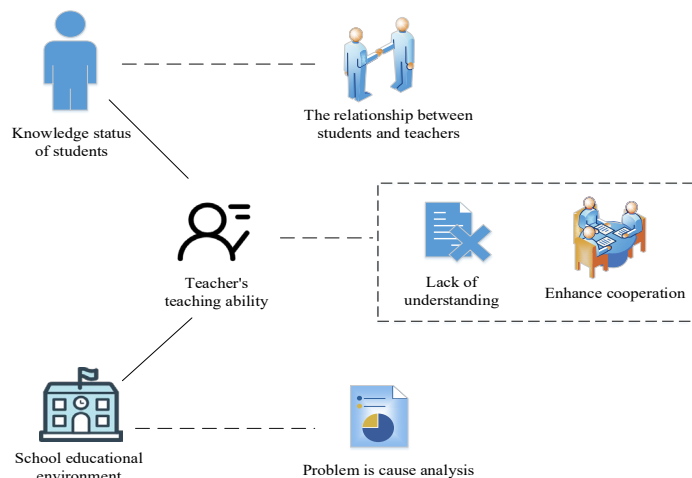


Figure 2: Diagnostic analysis of classroom teaching based on learning analysis

Classroom teaching diagnosis based on learning analysis technology can be divided into three dimensions: students' knowledge, teachers' teaching ability and school education environment. Among them, the evaluation of knowledge status is the basis for building a classroom diagnosis system and improving teaching quality. It is generally realized by analyzing the relationship between students' mastery ability and teachers' teaching situation, so as to find out the key factors affecting teaching behavior, and optimize teaching content and improve classroom teaching effect. The evaluation of teachers' teaching ability is the premise of establishing an effective teaching model, which can enable teachers to understand their shortcomings in actual work, such as backward teaching concepts, lack of innovative spirit, etc. [14]. In addition, it can also enhance the sense of cooperation among teachers. The diagnosis of the school education environment mainly includes the investigation of internal and external factors of the school, the in-depth analysis of the problems and causes in the school education environment, the evaluation of the overall school running level, the understanding of its operating status and development trend, and the provision of reference basis for improving school management.

### 3.4 Teaching Improvement Model Based on Learning Evaluation

The process of teaching improvement is learner-centered. Through the optimization and integration of knowledge content and methods, students are guided and cultivated purposefully and systematically. As one of the most important subjects in teaching activities, teachers should act as an active role in the process of classroom teaching reform. The improvement of classroom teaching process based on learning analysis technology can enhance the growth of teaching content to a higher level, and realize the real sense of teaching according to their aptitude [15]. The specific improvement model is shown in Figure 3.

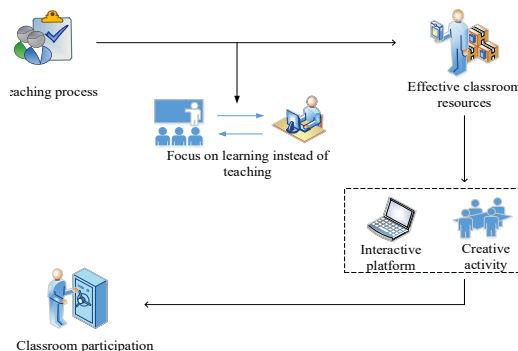


Figure 3: Teaching improvement model based on learning analysis

The teaching improvement model based on learning analysis technology mainly starts from four aspects. First, it emphasizes that teachers should pay attention to “learning” rather than “teaching”. Most students in the conventional teaching mode can only passively accept or rely on teachers, and it is difficult to exert their subjective initiative. The improved teaching mode pays more attention to human development, improves students’ subjective status, emphasizes students’ awareness of participation, fully respects students’ individual differences, and encourages students to think independently. The second is to provide more effective classroom resources, such as interactive platforms and personalized teaching services under the network environment, so that each student can get different degrees of display and exchange opportunities. At the same time, teachers are required to be able to use modern information technology to carry out some creative activities, such as group cooperative learning, and create a situation conducive to teachers and students to explore and obtain new information together. The third is to improve students’ participation in the classroom, and adopt diversified teaching methods, so that each student can actively obtain relevant information, such as using the question method to introduce new knowledge.

#### 4. Empirical Evaluation on Classroom Teaching Model in Colleges

##### 4.1 Evaluation Object and Method

A total of 300 students from a college of education were selected as a sample to build a student evaluation system. Questionnaire and interview methods were used to evaluate the teaching of teachers in various disciplines before and after the improvement, and the survey results were collected, as shown in Table 1.

*Table 1: Teachers’ teaching evaluation table before and after improvement*

	Before optimization			After optimization		
	Good	Medium	Poor	Good	Medium	Poor
Chinese	85	148	67	114	145	41
Mathematics	70	196	34	96	178	26
English	77	152	71	103	153	44
Physics	56	137	107	89	131	80
Geography	63	139	98	97	132	71

As shown in Table 1, before the optimization, 67 people thought that the teaching effect of the Chinese subject was poor and the teaching efficiency was low; 148 people thought that the teaching effect was average; 85 people thought that the teaching effect was good. However, the number of students with “medium” attitude after optimization has not changed much, but the number of students who gave “poor” scores has decreased significantly, and the number of students who thought that the teaching effect was “good” has also been greatly improved. It can be seen that effective design and implementation of the classroom by teachers in the process of classroom teaching can directly affect students’ learning ability, learning effect and comprehensive quality. In mathematics, English and other disciplines, people can also see this phenomenon. The difference is that in the evaluation of mathematics teachers, the number of students who hold the “medium” opinion has greatly decreased after optimization, and more is the result of the transformation from “medium” to “good”.

To sum up, there may be many problems in the actual teaching process, such as unreasonable arrangement of teaching materials, and outdated and boring teaching content, which lead to unsatisfactory classroom teaching effect. For this kind of phenomenon, teachers should take targeted measures to enhance their enthusiasm to participate in teaching activities, and make them form good learning attitudes and good habits, so as to achieve better teaching effect.

To ensure the authenticity and accuracy of the data, five classes of the school were randomly chose as research objects according to the survey results, and the relevant modules of teaching activities were optimized according to the model. Finally, the teaching effects before and after the optimization were compared from three aspects of classroom teaching atmosphere, teaching goal achievement and students’ learning achievements, and the experimental data were recorded and analyzed.

##### 4.2 Data Evaluation

###### 4.2.1 Classroom Teaching Atmosphere

The classroom atmosphere can enable students to study in a comfortable and pleasant atmosphere.

Teachers can create a harmonious classroom teaching environment between teachers and students by creating a good teaching environment, and measure the classroom atmosphere before and after optimization by the number of interactions between teachers and students. The results are shown in Figure 4.

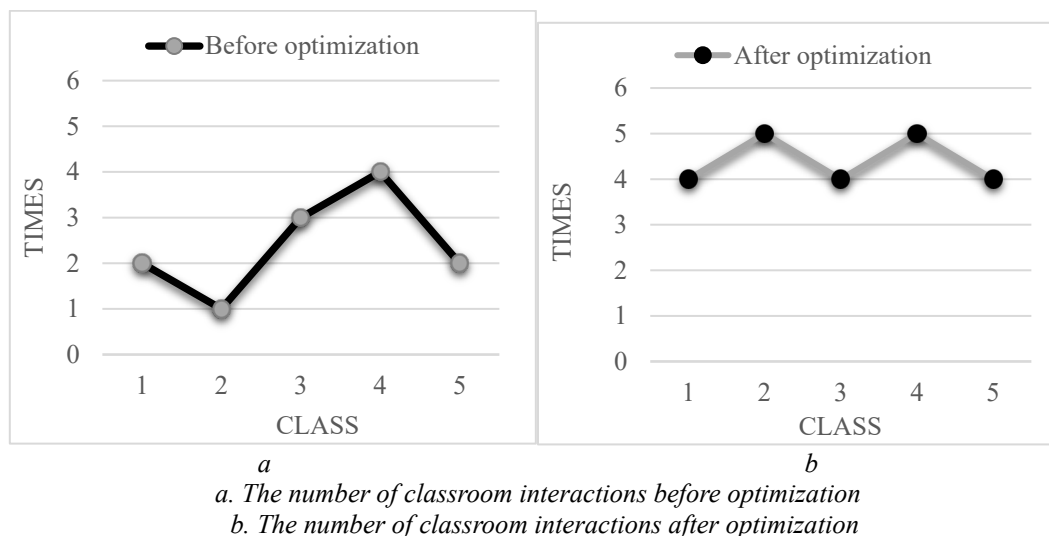


Figure 4: Comparison of classroom atmosphere before and after optimization

Figure 4a shows the number of classroom interactions before optimization, and Figure 4b shows the number of classroom interactions after optimization. It can be seen that the data distribution in Figure a is relatively scattered. In particular, the number of classroom interactions in Class 2 was only one, while the number of classroom interactions in Class 4 reached four. There was a huge gap between the two. Looking back at Figure b, the change trend of the curve showed a stable trend and the data was concentrated in higher areas, which showed that teachers can better control the classroom atmosphere and grasp the level of students' thinking development. Under this background, college classroom teaching can be effectively improved, and it can be transformed into a mode of teacher-student joint participation and cooperative inquiry, so as to achieve efficient learning.

To sum up, due to the difference of students' level and teachers' teaching ability, the classroom teaching atmosphere before optimization has not been fully exploited and brought into play, while the optimized classroom teaching atmosphere is more active, effective and conducive to improving the teaching efficiency, so the optimized classroom teaching structure is more reasonable and can better improve the teaching quality. Therefore, in the actual classroom teaching process, teachers should pay attention to the effective regulation and management of the interaction between teachers and students in the classroom to promote the good growth of students.

#### 4.2.2 Achievement of Teaching Objectives

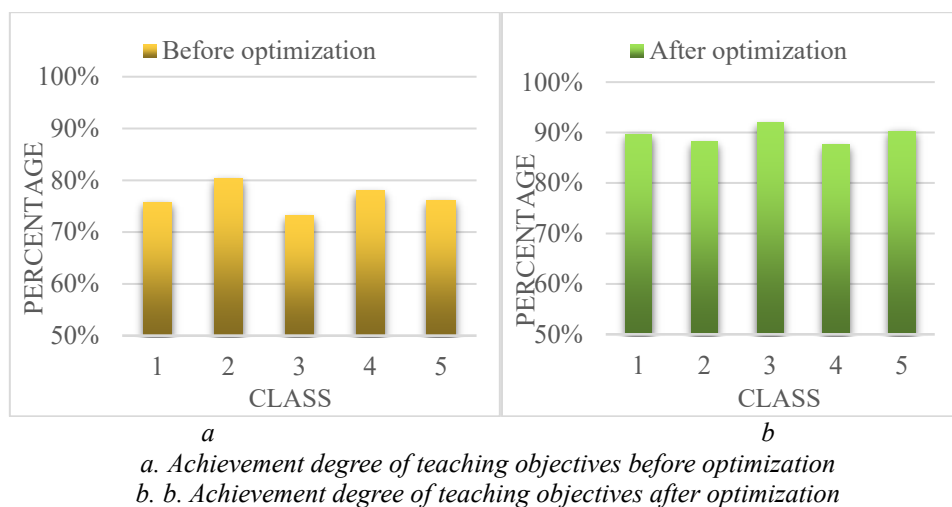


Figure 5: Comparison of achievement degree of teaching objective before and after optimization

Teaching objectives are the starting point of classroom teaching and the purpose of students' learning. The degree of achievement of teaching objectives directly affects the teaching effect and teaching quality. The teaching objectives of the five classes before and after optimization are shown in Figure 5.

As shown in Figure 5, Figure a shows the degree of achievement of the teaching objectives before optimization, and Figure b shows the degree of achievement of the teaching objectives after optimization. The highest degree of achievement of Figure a was not more than 80%, while in Figure b, the degree of achievement of all classes has reached more than 85%, and there was no significant difference between classes. Teaching diagnosis can help teachers find their own shortcomings, and then put forward targeted improvement measures to help students establish a more scientific and efficient learning mode. After calculation, the average degree of achievement of teaching objectives before optimization was about 76.7%; after optimization, it was about 89.54%; after optimization, it was about 12.84% higher than that before optimization. Therefore, the teaching efficiency after optimization was obviously higher than that before optimization, which meant that teachers need to make teaching plans and teaching contents based on students' conditions when carrying out teaching activities. At the same time, it can make students interested in what they have learned and apply it to practical activities.

#### 4.2.3 Student's Academic Performance

Student's academic performance is one of the important criteria to measure the quality of school education. After improving the classroom teaching based on learning analysis technology, the five classes would be tested once, and the average score of each class would be counted and compared with the average score before optimization. The results are shown in Figure 6.

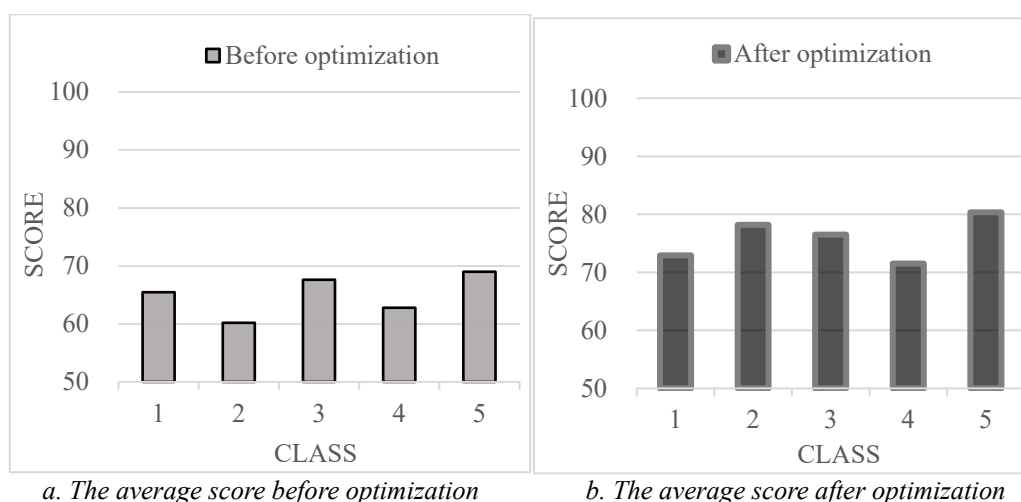


Figure 6: Comparison of students' academic performance before and after optimization of learning analysis techniques

As shown in Figure 6, Figure a shows the average score before optimization, and Figure b shows the average score after optimization. In Figure a, the average score of each class was below 70. The lowest score of Class 2 was about 60.2, which was far behind other classes. The average score data of each class in Figure b ranged from 70 to 85 points, and the overall span was larger than that in Figure a, but the students' academic performance has been greatly improved compared with that before optimization. From this phenomenon, it can be seen that the lack of pertinence and effectiveness of classroom teaching before optimization can easily lead to the lack of active communication between teachers and students, leading to the unsatisfactory learning effect of students. For the optimized teaching, teachers have been able to improve students' mastery of the content, and improve students' learning performance and teachers' teaching level in the classroom by introducing new knowledge, expanding new skills, creating situations, using cooperative inquiry and carrying out diversified activities.

## 5. Conclusions

College students are at a critical stage in the formation of values, outlook on life and outlook on the world. Classroom teaching should be the main way to cultivate students' correct thinking mode and



improve their practical ability. The teaching diagnosis and improvement model based on learning analysis technology can guide teachers to adjust the teaching content in the classroom. It can also stimulate students' initiative to explore, and encourage them to actively participate in teaching activities. Obtaining experience in practice would help students change from passive to active, fully tap their own potential, continuously enhance their comprehensive quality, and promote social sustainable development. This paper used research methods such as questionnaire and interview to explore the factors that affect the classroom teaching effect. Through integrating theory with practice, it explored a set of practical teaching methods and teaching strategies. The teaching diagnosis and improvement model based on learning analysis emphasizes the idea of interaction and win-win cooperation between teachers and students, so as to maximize the teaching effect and ultimately achieve the goal of improving teaching quality. This teaching concept is also gradually accepted and recognized by people, and the future university curriculum reform would develop in a more diversified direction.

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