A Study on the Application of Hybrid Teaching Model in Higher Vocational Analytical Chemistry in Post-MOOC Period

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Abstract: Analytical chemistry curriculum is one of the most important components in higher vocational colleges. In recent years, educators have been thinking deeply about how to improve the teaching level of this course in the post-mOOC period. Therefore, this paper analyzes the actual situation of the students in higher vocational colleges and the problems existing in the teaching of analytical chemistry courses, and expounds the application mode of the hybrid teaching mode of analytical chemistry in higher vocational colleges in the post-mOOC period, hoping to provide reference and reference for the relevant people through this article, thus laying a good foundation for improving the quality of analytical chemistry teaching in higher vocational colleges.

1. Introduction

With the continuous development of science and technology and the continuous popularization of network technology, the education community has ushered in the MOOC period. The so-called MOOC refers to the large open-ended courses based on the network. With the advantages of flexibility, convenience and rich teaching resources, it brings freshness to students and educators. However, over time, moocs have also entered the later stage, and their own shortcomings are gradually highlighted, including: lack of targeted guidance, curriculum resources are relatively monotonous, student participation is not high. Therefore, small-scale restrictive online courses emerge as the times require, that is, spoc courses, which are developed on the basis of moocs, which draw on the advantages of moocs in terms of educational ideas and teaching resources, and innovate and reform in teaching design, scale limitation and individualized teaching, effectively making up for the shortcomings of moocs [1]. It is fully explained that the SPOC teaching method can combine the advantages of the two, which cannot only stimulate the students' interest in learning, but also improve the quality of teaching. With the wider application, it has become the current mainstream mixed teaching mode in higher vocational colleges. Therefore, this paper analyzes the teaching characteristics of analytical chemistry courses in the Internet era, explores the teaching mode that the post-MOOC has reformed into, and takes the higher vocational college analysis course as the basis to lay the foundation for improving its teaching quality. as shown in Figure 1.
2. Analysis of the Students' Characteristics and the Problems in Teaching

With the deepening of the reform of education, the reform has realized the goal of teaching integration. However, limited by the teaching conditions of higher vocational colleges and the students' own reasons, the teaching mode of teaching as a whole cannot give full play to its function and value. Therefore, this paper analyzes the teaching characteristics of analytical chemistry courses in the Internet era, and explores the teaching mode of the post-MOOC reform [2]. The teaching of analytical chemistry involves a wide range of fields, including: food, chemical industry and so on. Higher vocational colleges, as an important organization to export talents for the society, need to improve students' professional ability and cultivate students' post skills as the core of teaching. However, combining with the current situation of analytical chemistry teaching in higher vocational colleges, we can see that it is difficult to achieve this goal, among which the fundamental reason is that the teaching mode of higher vocational colleges is lack of advanced nature, which cannot fully meet the needs of students and the development of modern technology [3].

2.1. Student Characteristics

Higher vocational colleges have the characteristics of complex students, and the students' learning foundation is relatively weak, and some students have negative psychology in the process of learning. As a result, the students' knowledge level and experimental skills are different in the actual teaching process, which makes the efficiency of analytical chemistry teaching less and less, and the current linear teaching methods of teaching according to their aptitude and stratified teaching methods in the field of education cannot fully meet the needs of analytical chemistry teaching in higher vocational colleges [4]. In addition, with the continuous development of science and technology, Internet technology is gradually popularized, which brings earth-shaking changes to the students' life and study in higher vocational colleges, and has a rich network experience because of the small contact with network technology. It makes the students generally feel boring when applying the traditional mode of teaching in higher vocational colleges [5]. And through multimedia and other ways to start teaching, it is conducive to stimulate students' interest in learning. Therefore, in the process of higher vocational analytical chemistry teaching, we should fully consider the actual situation of students and adopt the teaching method suitable for students' development, so as to meet the students' learning needs.

2.2. Problems in Teaching

Looking at the current situation of analytical chemistry teaching in higher vocational colleges in China, we can see that there are still some problems to be solved, which can be analyzed from the following four points:

The analytical chemistry course in higher vocational colleges is complex, with more theoretical knowledge, and the formula calculation is difficult. bring great challenges to teachers' theoretical teaching. As mentioned above, the teaching task of higher vocational colleges is to export applied talents for the society, so in the teaching process, it is necessary to improve students' post skills and help students to establish a correct post attitude. It can be seen that the analytical chemistry analysis of higher vocational colleges needs to put the experimental, practical and theoretical courses in the same position [6]. However, at present, most higher vocational schools, because there is no scientific allocation of curriculum content, resulting in the curriculum system of theoretical and practical teaching imbalance phenomenon.

At present, most higher vocational colleges still follow the combination of traditional theoretical teaching and experimental teaching, or the teaching of integrated teaching mode to carry out analytical chemistry courses, these two teaching methods are teachers as the main body, students need to follow the teacher's thinking in the process of learning passive learning, not fully think about time, seriously violate the teaching rules of analytical chemistry, and cannot fully meet the needs of students. Even though some colleges and universities have started MOOC platform, the lack of self-discipline of students leads to the problem of poor participation in teaching mode.

Higher vocational colleges are affected by the shortage of funds and the teaching environment in
the process of developing analytical chemistry teaching. As a result, students cannot understand the theoretical content through personal practice in their study, which seriously affects the quality and efficiency of analytical teaching. The concrete embodiment is that the related equipment of higher vocational schools is less, the equipment is old, the lack of advanced instruments, and the site is small and the work station is small. Even to carry out experimental teaching, students need to be divided into multi-person group form, some students cannot operate the equipment in person, thus resulting in less and less teaching efficiency.

Under the influence of examination-oriented education, analytical chemistry courses in the evaluation system, often 30% of the usual results plus 70% of the test results as the evaluation criteria, resulting in the lack of targeted evaluation methods, cannot truly reflect the knowledge ability of students. is also not conducive to improving the skills training of students.

3. The Application of Hybrid Teaching Model in Higher Vocational Analytical Chemistry in Post-MOOC Period

On the basis of MOOC, the application of SPOC hybrid teaching mode needs to be analyzed from the two sides of the curriculum and the whole design. Figure 2 shows the flow chart of the mixed teaching mode.

![Flow chart of the hybrid teaching model](image)

**Figure 2 Flow chart of the hybrid teaching model**

### 3.1. Analysis of the SPOC Hybrid Teaching Model

First of all, we need to set the correct teaching goal and set the teaching content reasonably. In order to achieve this goal, it is necessary to analyze the actual situation of students in higher vocational colleges and the actual standards of social demand for talents. In order to analyze how the chemistry course needs to achieve the teaching effect, how to make the students master the theoretical knowledge and skills while ensuring the flexibility of application. In the SPOC hybrid teaching mode, teachers need to take the cultivation of students' practical skills as the core of teaching, and formulate teaching objectives, and refine the teaching objectives into units or knowledge points, so as to guide students to carry out their learning.

Fully consider the differences between students to stimulate students' interest in learning

As mentioned above, students in higher vocational colleges have poor theoretical knowledge and lack of self-discipline, which leads to uneven learning level, while SPOC hybrid teaching mode can break through the dull and single disadvantages in traditional teaching mode, which is helpful to stimulate students' curiosity and learning enthusiasm, and enable students to improve their learning ability in interactive communication.

Improving the teaching environment of analytical chemistry and formulating scientific teaching plan

Combining with the analysis of the existing teaching resources in the analytical chemistry classroom in the present higher vocational colleges, it is necessary to make full use of the advanced teaching tools to perfect the teaching environment in the process of developing the SPOC hybrid teaching mode, so as to lay the foundation for the formulation of the scientific teaching plan. as
shown in Figure 3.

Figure 3 Multimedia teaching environment

3.2. Overall Design

1) Development of teaching resources

In the process of SPOC hybrid teaching mode teaching, we need to fully develop the teaching resources, including: curriculum guidance resources, online learning resources, quality expansion resources and sharing open resources, so as to optimize the post-mOOC period presented a single way of resource presentation this problem. It is beneficial for students to seek scientific learning methods in the rich teaching resources, thus improving learning efficiency.

2) Scientific setting assessment system

In the SPOC hybrid teaching mode, it is necessary to change the traditional single assessment system and score the students through the online learning feedback and classroom interactive evaluation, experimental skills evaluation, curriculum assessment and professional quality evaluation and other diversified evaluation methods. At the same time, because of the differences between students, in the process of evaluation, it is necessary to analyze the actual situation of students and adopt targeted evaluation methods to enable students to make progress in constantly breaking through themselves, thus promoting the all-round development of students.

4. Conclusion

To sum up, analytical chemistry is one of the important components of higher vocational colleges, which involves a relatively rich content, including: food, medicine, chemical and other aspects. In the process of teaching, it is not only necessary for students to master the theoretical knowledge of the course, but also to train students' post skills. Its teaching quality directly affects the students' subsequent development. In traditional teaching, teachers often use both theoretical teaching and experimental operation. With the deepening of the reform of education, the reform has realized the goal of teaching integration. However, limited by the teaching conditions of higher vocational colleges and the students' own reasons, the teaching mode of teaching as a whole cannot give full play to its function and value. Therefore, this paper analyzes the teaching characteristics of analytical chemistry courses in the Internet era, and explores the teaching mode of the post-MOOC reform.

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