Key Points, Pain Points and Release Points in the Teaching of Organic Chemistry for Traditional Chinese Medicine Specialties in the Ethnic Areas of Southwest China

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Abstract. Organic Chemistry is an important foundational course for all majors of traditional Chinese medicine. However, due to the high threshold for the introduction of this course and the characteristics of the learning situation in the ethnic minority areas of Southwest China, the teaching effectiveness of this course in all majors of traditional Chinese medicine in our school is unsatisfactory. Therefore, the teaching team conducted research and found that the key and pain point of teaching Organic Chemistry in our school's majors of traditional Chinese medicine is how to learn more difficult content in less teaching time. The key to solving this problem lies in adopting what kind of "lively and interesting" teaching method to transmit "highlighted content" in less teaching time. Based on this, the teaching team has carried out reforms in three aspects: "humanization of teaching presentations", "case-based teaching design" and "digitalization of teaching resources" for Organic Chemistry, which have achieved significant results. However, more precise and personalized teaching methods are still the direction for the next reform.

Keywords: Organic Chemistry; Traditional Chinese Medicine; Teaching Reform; Humanities; Case Base.

1. Introduction

Organic Chemistry is an important foundational course for various traditional Chinese medicine majors and is also an important course in the training of many engineering and science majors. Due to the distinct logical characteristics and experimental attributes of this course, most instructors have adopted a more linear and direct teaching method in the past, resulting in a higher threshold for the introduction of this course, a longer process for digesting knowledge points, and a less effective classroom teaching effect. This has increased the ideological burden on students, making it a more difficult course to learn among engineering and science majors.

On the other hand, due to the social science attributes of traditional medicine, there is often a phenomenon where both arts and science students are enrolled in the same major in colleges and universities of traditional Chinese medicine. Due to the characteristics of senior high school education in China, the natural science foundation of arts and science students is not the same, and there are significant differences in learning habits and thinking between these two types of students. In the same classroom, it is very easy for different absorption effects to occur at the same knowledge point. In addition, the author's university is a university in western China, which shouldering the responsibility of attracting and cultivating a large number of local students. The level of students' learning foundation and ability spans widely, which exacerbates the problem of different absorption effects at the aforementioned knowledge points. In the teaching of Organic Chemistry in various Chinese medicine majors at our university, most classes struggle to achieve satisfactory teaching results.

Based on this, the course team conducted research and studies to try to understand the key points and pain points of the teaching of Organic Chemistry in the traditional Chinese medicine major at our school, and carried out teaching explorations to find a solution to the teaching difficulties.
2. Teaching Survey

In 2023, the teaching team distributed a survey questionnaire with three questions to one of the learning classes, and 77 questionnaire results were returned. The questionnaire topics and analysis results are as follows:

Question 1: Please rate the importance of various chapters in Organic Chemistry on a scale of 1 to 10 (where 1 is the lowest and 10 is the highest)

![Fig. 1 Line chart of the results of questionnaire item 1](image)

After Cronbach's Alpha analysis of questionnaire item 1, it can be seen that the reliability coefficient value is 0.951, which is greater than 0.9, indicating that the reliability quality of the research data is very high. Regarding the "CITC value", the CITC values of the analysis items are all greater than 0.4, indicating that there is a good correlation between the analysis items, and also indicating a good reliability level. In summary, the reliability coefficient value of the research data is higher than 0.9, which comprehensively indicates that the data reliability quality is high and can be used for further analysis.

After analysis of the validity of questionnaire item 1, it can be seen that the commonness values of all research items are higher than 0.4, indicating that the information of research items can be effectively extracted. In addition, the KMO value is 0.866, which is greater than 0.6, indicating that the data can be effectively extracted. Furthermore, the variance explained by the two factors is 41.266% and 33.718% respectively, and the cumulative variance explained after rotation is 74.984%, which is greater than 50%. This means that the information content of research items can be effectively extracted. In addition, the KMO value is greater than 0.8, indicating that the research data is very suitable for information extraction.

Question 2: Please rate the difficulty of each chapter in Organic Chemistry on a scale of 1-10 (where 1 is the easiest and 10 is the hardest)
After Cronbach's Alpha analysis of questionnaire item 2, the reliability coefficient value is 0.960, which is greater than 0.9, indicating that the reliability quality of the research data is high. Regarding the "CITC value", the CITC values of the analysis items are all greater than 0.4, indicating that there is a good correlation between the analysis items, and also indicating that the reliability level is good. In summary, the reliability coefficient value of the research data is higher than 0.9, which comprehensively indicates that the data reliability quality is high and can be used for further analysis.

After analysis of the validity of questionnaire item 2, it can be seen that the commonness values of all research items are higher than 0.4, indicating that the information of research items can be effectively extracted. In addition, the KMO value is 0.896, which is greater than 0.6, indicating that the data can be effectively extracted. Furthermore, the variance explained by the two factors is 41.303% and 38.196% respectively, and the cumulative variance explained after rotation is 79.499%, which is greater than 50%. This means that the information content of research items can be effectively extracted. In addition, the KMO value is greater than 0.8, indicating that the research data is very suitable for information extraction.

Question 3: Please rate the importance of the following learning or teaching methods in the process of learning Organic Chemistry. (A full score of 10 points, the higher the score, the more important.)
Fig. 3 Line chart of the results of questionnaire item 3

After Cronbach's Alpha analysis of questionnaire item 3, the reliability coefficient value is 0.863, which is greater than 0.8, indicating that the reliability quality of the research data is high. Regarding the "CITC value", the CITC values of the analysis items are all greater than 0.4, indicating that there is a good correlation between the analysis items, and also indicating that the reliability level is good. In summary, the reliability coefficient value of the research data is higher than 0.8, which comprehensively indicates that the data reliability quality is high and can be used for further analysis.

After analysis of the validity of questionnaire item 3, it can be seen that the commonness values of all research items are higher than 0.4, indicating that the information of research items can be effectively extracted. In addition, the KMO value is 0.683, which is greater than 0.6, indicating that the data can be effectively extracted. Furthermore, the variance explained by one factor is 65.587%, and the cumulative variance explained after rotation is 65.587%>50%. This means that the information content of research items can be effectively extracted. In addition, the KMO value is between 0.6 and 0.7, indicating that the research data is suitable for information extraction.

The analysis of reliability and validity of each question can prove that this questionnaire can effectively analyze the key points, pain points, and release points of Organic Chemistry.

From the results of questions 1 and 2 of the survey questionnaire, it can be seen that the key points and difficulties of the Chinese medicine version of Organic Chemistry at our university show a trend of increasing gradually as the teaching chapters move forward. In our university's training program, Organic Chemistry is taught throughout the year, but the teaching of the chapters with higher survey scores are almost entirely arranged in the second half of the year. Due to the large number of courses in this semester, the number of class hours for Organic Chemistry is actually less than in the first half. This presents a challenge: it is necessary to achieve better teaching results with less class hours for the more difficult content.

In addition, the results of question 3 of the survey questionnaire indicate that "highlighting key points" and "making classroom teaching vivid and interesting" are very important means to enhance the effectiveness of classroom teaching.

In summary, the key and challenging aspects of teaching Organic Chemistry in the field of traditional Chinese medicine at our institution are obviously: how to effectively learn more difficult content in less teaching time. The solution to this dilemma lies in: adopting what kind of teaching method that makes the "classroom teaching vivid and interesting" to deliver the more difficult but "key-point-oriented" content in less teaching time.
3. Teaching Reform

Based on the previous analysis, the teaching group has carried out the following three aspects of teaching reform:

First, humanization of teaching presentations
The role of humanistic knowledge in aiding and even guiding the study of natural science is not hard to understand. The ancient Greeks summarized the two into one word - "Philosophia", which is also the etymology of the term "Philosophy" [1]. This already shows that although there are differences between the two, there is a unity, both falling under the category of "rationality". Traditional medicine is a concrete manifestation of this unity. Although humanistic theories cannot directly guide the understanding of natural science knowledge, they can guide the establishment of learning thinking. In the teaching of some key knowledge points, teaching methods with humanistic characteristics are also beneficial for understanding and digesting these important knowledge points [2].

Second, case-based teaching design
Case-based teaching design is an effective teaching method that can help students better understand and master knowledge points, improve practical application ability, and also contribute to the standardization of teaching quality for teaching teams [3-4]. Therefore, in recent years, our teaching group has constructed multiple case libraries. During the teaching process, when teachers in the teaching group design cases for key knowledge points, they match them with the most suitable cases from various case libraries according to their needs, which not only enhances the vividness of the classroom but also contributes to the standardization of teaching quality among different teachers.

Third, digitalization of teaching resources
The students majoring in traditional Chinese medicine at our university come from a variety of backgrounds, with significant differences in their knowledge bases and learning capabilities. At the same time, there are issues of "not being able to digest" and "not getting enough". However, the optimization and adjustment of online resources is delayed, which affects the optimal effectiveness of online education. Blended learning, both online and offline, is the best solution to address these issues [5-6].

Before the teaching reform, more than 90% of the students did not pass their exams, and the class average scores were often below 40. However, after the teaching reform, this situation has been significantly improved. The failure rate of the exams has been reduced by more than half, more than 20% of the students can obtain a score of 70 or above, and nearly 10% of the students can achieve excellent scores. This shows that the teaching reform of the teacher group has achieved significant improvement.

4. Summary

Organic Chemistry is an important foundational course for all majorities of Chinese medicine. However, due to the high threshold for introduction and the characteristics of the learning situation in the Southwest ethnic minority areas, the teaching effectiveness of this course in all majors of Chinese medicine in our school is unsatisfactory. Based on previous research, the teaching system of Organic Chemistry has been reformed in three aspects, achieving significant results. However, more precise and personalized teaching methods are still the direction for the next reform.

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References


