

Exploration of Blended Online and Offline Teaching Based on "Medicinal Basic Chemistry"

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Abstract Medicinal Basic Chemistry" integrates the basic theories and knowledge of inorganic chemistry and organic chemistry. However, our school's students have different foundations when entering the school. In the blended teaching of online and offline courses, students can choose whether to watch or not, teach according to their aptitude, and meet the personalized growth needs of students. Through mutual assistance discussions on self-prepared topics, independent thinking is first completed, and then group discussions are optimized, students can be urged to actively learn and judge whether others' ideas are reasonable. Suggestions for modification are proposed, and others are taught. By using good to lead and medium to lead, students can achieve overall improvement at the class level. This method is also applicable in practical training courses.

Keywords Blended Learning; Personalized Teaching; Medicinal Basic Chemistry

Cite This Article Cui L. S, Ren X.L, Li X.X & Sui C.Y. Exploration of Blended Online and Offline Teaching Based on "Medicinal Basic Chemistry". Journal of History, Culture and Humanities. 2024, 3(5): 97-102. <https://doi.org/10.55571/jhch.2024028>

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Received: September 26, 2024 / Accepted: October 4, 2024 / Published: October 10, 2024

Research Background

Medicinal Basic Chemistry is a fundamental course in the field of drug quality and safety. It is a discipline that studies the sources, structure and characterization, properties, preparation, applications, as well as related theories, laws of change, and methodology of substances. It is also the foundation of biology, medicine, and pharmacy.

Our school's "Medicinal Basic Chemistry" is a professional basic course for first-year students majoring in pharmaceuticals and quality safety, with a total of 64 hours and 4 credits. It is offered in the first semester of the freshman year, with a total of 336 students and 7 parallel classes.

The book "Medicinal Basic Chemistry" integrates the basic theories and knowledge of inorganic chemistry and organic chemistry, teaches chemical basics (data processing and periodic law of elements), four major chemical equilibria, and the naming, structure, reaction and mechanism, preparation and application of various compounds such as alkanes, cycloalkanes, alkenes, dienes, alkynes, aromatic hydrocarbons, halogenated hydrocarbons, alcohol phenol ethers and aldehyde ketone quinones. Based on professional needs, the focus is on the organic chemistry part. The research sample consists of 336 people and 7 classes, with two teachers working together to complete the teaching work. The average number of students in my teaching class is 47. According to the survey, students can be divided into three categories: the first category has studied chemistry courses in high school, accounting for about 15% of the total number of students. They have a good foundation in chemistry and can learn this course relatively easily. They hope to have a more systematic and in-depth understanding of the content of this course. Truly understanding some of the content in previous learning that was not understood but simply memorized.

The second type of students have not studied chemistry in high school, and they are the majority, accounting for about 70% of the total number of students taking courses. Their chemistry foundation is still in the third year of junior high school, and their foundation is average. They usually need to study seriously and spend a lot of time to learn this course well.

The third type of students are those who enter our school through single enrollment in secondary vocational colleges. They have a poor foundation in chemistry, but strong experimental skills, and find it difficult to learn theoretical courses, accounting for about 15% of the total number of students taking courses.

Overall, this course has a lot of content, complex student situations, and relatively heavy course burden.

The blended learning model combines the advantages of traditional face-to-face teaching and online learning, providing students with a more flexible, autonomous, and efficient learning experience. The following are the main advantages of blended learning:

1. Expand learning time and space:

By utilizing information technology, blended learning can fully mobilize students' participation and interaction and broaden their learning time and space.

2. Timely obtain student feedback information:

Combining online and offline teaching environments, blended learning can timely understand students' learning status and provide real-time feedback to teachers

Teacher, promote teachers to adjust teaching strategies in a timely manner according to the situation.

3. Enrich students' learning methods:

Blended learning fully leverages students' active role, stimulates their learning enthusiasm, initiative, and creativity, and diversifies learning methods, such as online and offline learning, and the combination of the internet and the classroom.

4. Diversify teaching evaluation:

Blended learning adopts a combination of process and outcome evaluation, as well as online and offline evaluation, to ensure the diversity and comprehensiveness of evaluation results.

5. Meet the personalized needs of students:

Based on the promotion of educational informatization and the application of information

technology, blended learning mode provides students with learning conditions of "everyone can learn, everywhere can learn, and always can learn".

Enhance the attractiveness and targeting of ideological and political courses:

By utilizing the multimedia and interactive features of online platforms, blended learning models can provide a rich and diverse range of ideological and political course materials

Source, make the content of ideological and political courses more vivid and interesting, and improve the pertinence and effectiveness of ideological and political courses.

7. Enhance the practicality of ideological and political education in universities:

Through online and offline interaction and collaboration, blended learning mode increases students' classroom participation and enables them to

In ideological and political courses, it is not just passive acceptance of knowledge, but active exploration and problem-solving.

8. Enhance the influence of ideological and political education in universities:

The blended learning model can combine the content of ideological and political courses with social reality, international perspectives, and the development of the times through online platforms, making the content of ideological and political courses more extensive and in-depth, thereby better expanding students' learning horizons.

These advantages make blended learning a new star in educational reform, helping to improve teaching quality and cultivate innovative talents. The advantages of blended learning make up for the current disadvantage of students having different foundations, customizing different learning tasks for different students to enable them to make progress and develop.

Curriculum Construction

As an introductory course for the major, this course aims to help students achieve the following goals in terms of knowledge, skills, and values, Knowledge objective includes Train students to systematically master the structure, properties, preparation, and applications of various compounds; Students who receive training have a preliminary understanding of general research methods in chemistry. Ability objective includes Cultivate students' ability to see the structure of chemical substances and predict their physical and chemical properties; Cultivate students' preliminary abilities in reverse synthesis analysis and synthesis route design of small molecule organic compounds; Students have the preliminary ability to explain experimental phenomena based on experimental results. Value objective includes Incorporate humanistic spirit and curriculum ideology into the teaching of basic chemistry, guiding students to appreciate and appreciate the scientific beauty of chemistry, stimulate students' interest and enthusiasm for learning, cultivate their scientific attitude and innovative spirit of hard work in learning; Guide students to become comprehensive talents who harmoniously integrate scientific spirit and humanistic sentiment.

Based on the analysis of the students' learning situation in the class, the key issues that need to be addressed in the teaching reform of this course are as follows:

A. How to teach students according to their different foundations?

B. How to enhance the motivation and initiative of students with general and weak foundations in learning?

C. How to enhance students' ability to apply their learned knowledge to solve practical

problems?

We have built and integrated the resources needed for the learning process of this course: Firstly, Online, we have built a complete pharmaceutical basic chemistry course on the Chaoxing Classroom platform for students to preview and review; Secondly, we upload the relevant learning content in advance from the resources based on the students' learning progress. Thirdly, guide students to use our school's rich library resources for extended learning, such as databases like CNKI and VIP. What's more, establish a course QQ group to provide a platform for students to answer questions and clarify doubts outside of class. Due to the large number of classes and students, a class representative has been selected for each class. The class representative is responsible for collecting students' doubts, suggestions, and opinions on the course after class, and regularly posts them in the group to facilitate course review and improvement.

Course Teaching Design Ideas

We rely on the above resources, based on the course objectives, combined with the learning effect pyramid, and use Professor Xu Yu's blended "five style" teaching method from the University of Science and Technology of China to encourage students to shift from passive learning to active learning. The "Five Methods" teaching method. The overall design and implementation of the blended "five style" teaching method are as follows: the first class of each semester is an offline class, and the teacher informs students of the overall design of the course, course content, teaching methods, grade evaluation, requirements for students, and course learning methods, so that students can have a comprehensive understanding of the course.

Guided pre class preview: The offline course consists of 11 chapters, each of which is arranged for online self-study and offline teaching. Students are required to complete the online pre class preview test of MOOC at a designated time before class and can choose whether to watch the video according to their personal situation. Online preview test (10%), every student is required to complete.

Accurate classroom teaching: After students complete the online pre class preview test, Chaoxing Classroom will immediately conduct grading and statistics. Before class, teachers will use statistical data to understand students' mastery of various knowledge points, as well as their weak knowledge points. In offline classes, teachers will accurately explain key and difficult points and weak points, deepening students' understanding and mastery of key and difficult content; At the same time, the teacher led the students to organize the content framework of each chapter based on the mind map, in order to compensate for the fragmented learning in Chaoxing Classroom.

Peer support discussion: After each chapter is completed, students need to complete online chapter assignments (10%). Offline, students will be divided into groups of 5 people each (good: medium: poor=1:3:1). Each student needs to prepare exercises related to the current learning content, which will be screened by the teacher and distributed to the group for answering. Each student in each group first completes independently, using a black pen to complete the task, followed by a group discussion to form an optimized problem-solving approach. They then use a blue pen to revise and submit their assignments. **Demonstration style comments:** The teaching assistant collects and corrects the assignments with a red pen and provides feedback to the students. At the same time, the teaching assistant summarizes the common problems of the students and reports them to the

teaching teacher. The teacher organizes a class discussion on the common problems to form an optimized problem-solving approach for the whole class. Finally, the teacher provides demonstration style comments, and the students compare and comment to find shortcomings. They then use a green pen to revise again, gradually improving the students' ability to apply their learned knowledge to solve complex problems. When there are doubts about cutting-edge theories, teachers guide students to use library databases to search for original literature, obtain the current research status of the academic community on the issue, and cultivate students' ability to explore and innovate.

Full program assessment. This course adopts a full program assessment, which is divided into two parts: online (40%) and offline (60%). Online grades include 10% of pre class preparation tests, 10% of in class attendance, 10% of online stamp assignments, and 10% of online mid-term tests; Offline final exam 60%.

We take 'Chemical Health' as an example to design and implement it: Taking typical substances as examples, understand ionic bonds and covalent bonds, and establish the concept of chemical bonds; Able to distinguish between ionic compounds and covalent compounds from the perspective of macroscopic phenomena and chemical bonds; Can explain the properties of matter from the perspective of particle composition and interaction.

Ability objective: Able to master the method of researching problems from individual to general; Theoretical models that can describe and represent chemical bonds; Able to characterize ionic and covalent bonds electronically.

Value objective: Closely linking ideological and political education courses with daily life, for example: Japan discharged nuclear wastewater into the ocean, which affected the consumption of some salt. As students of drug quality and safety, what can we do to guide students to apply theoretical knowledge to practice, cultivate students' scientific attitude and innovative spirit of continuous learning.

Conclusion

Students are more willing to actively raise questions and communicate with teachers in class, and they are also more willing to express their evaluation methods throughout the entire process. Students are also more willing to accept the deep integration of ideological and political education with course content in accordance with the characteristics of the "Medicinal Basic Chemistry" course. For example, in the teaching process, we incorporate stories of chemical masters such as Mr. Hou Debang, Ms. Tu Youyou, Nicholas, etc. Their research achievements have saved countless lives, guiding students to establish correct values and apply their learned chemical knowledge to benefit humanity. Secondly, we combine current events and news, such as the impact of Japan's nuclear wastewater discharge on real life. At the same time, we apply chemical theoretical knowledge to practical life and professional fields to enhance students' learning interest and motivation. We have adopted Professor Xu Yu's "Five Style" teaching method from the University of Science and Technology of China, which can teach students according to their aptitude and meet their personalized growth needs. After class mutual aid discussion session, the teacher prepares the theme for students to work together in groups, and later allows students to independently raise questions and complete them in groups. Teaching assistance is used as a gatekeeper to truly focus on students as the theme. In blended online and offline teaching, students can independently choose

whether to watch course resources, tailor teaching to their individual needs, and meet their personalized growth needs: through mutual assistance discussions on self-provided topics, independent thinking is first completed, and then group discussions are conducted to optimize, students can be encouraged to actively learn and evaluate whether others' ideas are reasonable, propose modification suggestions, teach others, and achieve overall improvement of the class by using good to guide the middle and using middle to guide the poor. This method is also applicable in practical training courses. By using a blended online and offline teaching method, students can transition from passive learning based on input in traditional teaching models to active learning based on output in new teaching methods. Especially for students, based on their personal learning reality, they independently use online super star classrooms, library databases, e-books and other resources to achieve selective learning, which not only meets the personalized learning needs of students, but also greatly broadens their horizons for learning this lesson. By teaching peers, students' understanding, and mastery of theoretical knowledge are significantly improved. Through the integration of ideological and political education into the curriculum, mutual aid group discussions, and other activities, students' learning enthusiasm and effectiveness have been significantly improved. After teaching practice at the beginning of this semester, the teaching effectiveness of this lesson has been significantly enhanced.

Acknowledgement

Funding information: The 14th Five-Year Project of Chongqing Municipal Education Science Commission (No: K23YG3280354).

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