

# The Exploration and Practice on the Construction of the Experimental Network Teaching Platform of “Pharmaceutical Practical Instrument Analysis”

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**Key Words:** Pharmaceutical practical instrument analysis, experimental teaching, network teaching platform

**Abstract:** According to the characteristics of pharmaceutical practical instrument analysis course, and combined with the content of experiment teaching as well as the modern multimedia and network technology, to explore a new instrument analysis course teaching model which meets the characteristics of pharmacy and to construct the experimental network teaching platform of the course.

## Introduction

Pharmaceutical practical instrument analysis is an instrumental analysis course for pharmacy specialty, and it introduces the basic structure, basic principles and operation methods of the analysis instruments which used in pharmacy major. This course is of high professional practice, so experiment teaching is particularly important. It's an important way for students to know the structures of all kinds of analysis instruments, to be familiar with the operation methods of a variety of instruments, to understand all the principles of the instrument, to understand the theoretical knowledge learned in class.

In experiment class, the analytical instrument is the main teaching tool, while with the development modern analytical instrument into composited, intelligentized, versatized, the students have few chances to contact internal structure and components. Usually, the deductive methods are used, that is the teacher demonstrates first, then the students practice after watching, and master the correct operation method. This teaching method can make students grasp the operation of instruments quickly, but because of the limitation of student number, it is difficult to let every student to see the details of each operation clearly. On the other hand, for some large and expensive analysis instrument, such as mass spectrometry, nuclear magnetic resonance spectrometer, liquid chromatography and mass spectrometry hyphenated instrument, most schools only purchase one set. It is difficult to teach experimental classes among students. In addition, in order to prevent the analysis instrument from damage and dust, it is generally not allowed to display internal structure for student. The result is that after learning instrument analysis experiment, the students are not very clear about the internal structure and working principle of instruments, they only master the simple operation methods. If you want students really understand the instrument analysis experiment, and get lots of helps from the experiment for their future research and work, this will limit the effect of experimental teaching.

At the end of the eighties of the 20<sup>th</sup>, computer technology which is marked by multimedia developed rapidly. More and more techniques were adopted in classroom teaching such as PowerPoint, flash, Photoshop and Authorware and etc. These technology demonstration reached the goal that shows students the principles of instruments, and broadened students' understanding and knowing of the abstract theories in the books. But this application is more like monotonous, point to point demonstrate teaching, and cannot display the content of the experiment in front of students intuitively, truly and interactively, and it is difficult to stimulate students' learning interest and enthusiasm. Since entering the 21st century, streaming media, virtual reality 3D technology and interaction technology network technology have obtained rapid development. The network bandwidth is also gradually break through hundreds of megabytes, the problems constraining network teaching have been solved, so the network teaching platform of experimental classes will become trend and the inevitable process. The establishments of multimedia network experimental platform on the basis of the conventional demonstrate experiment is helpful to solve the practical problems encountered in the "pharmaceutical practical instrument analysis" experimental teaching.

### **The present situation of experimental network teaching platform at home and abroad**

Multimedia network experiment teaching platform is established on the basis of network curriculum, and it is a network curriculum based on the experimental content, and it is based on the virtual experiment content, and to establish a more real, more realistic virtual environment for learners by using a variety of methods and techniques. This virtual environment simulation forms a three-dimensional space that makes learners exposed in it have the sense of immersion and presence, as if the real operation, to solve the equipment shortage problems appeared in experimental courses.

In 1850s overseas, there has been a network course resource shared, and under the guidance of Open, Access, education and teaching are becoming more and more open, shared, international. Led by the open curriculum movement initiated by MIT in 2001, the current domestic and international trend of network course resources sharing has been presented. We have some network teaching platform at home, such as soft cool, and many colleges and universities' online teaching platform provide us good opportunities to learn.

### **The construction of the network teaching platform of pharmaceutical practical instrument analysis**

We mainly carry out the following measures about the construction of the experimental network teaching platform of pharmaceutical practical instrument analysis.

#### **Optimize the experimental content and reform the experimental system**

Instrumental analysis experimental teaching is limited by the number of instruments and the experimental fields, the arrangements of experiments are usually not synchronized with the content of the lecture. And students often find it difficult to understand the complex structure of the instruments and abstract principles through classroom teaching, so the operations are still exam oriented. For example, the contents of the infrared spectrum experiment, most of it is a number of validations, demonstration experiments, additionally because of the shortage of comprehensive and design experiment, which makes the traditional teaching mode cannot inspire the students' creative thinking or arouse students' interest, so the aim cultivating engineering innovative ability cannot be achieved.

We proceed from actual production, to optimize the curriculum content according to the

requirements of the industry and professional characteristics, including building auxiliary teaching system, electronic and multimedia network resource utilization, and network teaching materials as well as instrumental analysis experiment simulating the operation of the software development and etc. In addition to making full use of all kinds of network resources, we also form an interest group to participate in the construction of the experimental network teaching platform. Experimental network teaching platform is used for pharmacy undergraduates, students through online booking, online preview, online operation, etc. to complete the learning process. The platform can not only solve the problem of the shortage of instrument resources, but also help students to fully prepare for the real operation. In the virtual experiment teaching operation process, learners can use the prompt operation, and can carry out the innovation experiment independently, so it can fully mobilize the student's independent innovation enthusiasm. Students could understand some experimental principle and equipments composition and operation information through experimental simulation first, and then be inspired learning interests by real situation, the animation rendering and rich colors. Hence students won't behave helpless in front of the real instruments. And students are clear with the knowledge and their operation abilities have been strengthened through virtual experimental training.

### **Reform the traditional model to stimulate students' initiative**

Many students are lack of awareness of the importance of the pharmaceutical practical instrument experimental course. For a long time, the teaching use the traditional method, that is "teacher explains, students repeat". The teacher teaches a lot, and even demonstrates step by step. In this case, the students will rely on teacher naturally and cannot think autonomously, and always be in a passive situation. Students cannot preview the experimental content completely, and only imitate the experiment guide book mechanically. They are lack of initiative in the process, and write the report carelessly, thus the experiment results is difficult to be guaranteed. So it is time to change the traditional teaching method.

In the pharmacy practice instrument analysis experiment teaching in which the computer as the carrier, teachers change from the main body of teaching activities into organizer, guiders, helpers in the whole teaching process, and students have gradually become the active participants and active explorers. This teaching model can enable students to master the knowledge, and to grasp strategies which hidden behind the knowledge, and it help students learn how to learn, and train students autonomous learning abilities. According to the idea of "from top to bottom, stepwise refinement", teachers can decompose the semester' overall objectives according to different chapters or knowledge spots, and at least decompose to each class. The goal of the class can be designed by the students themselves, so as to gradually achieve the goal of personalized. Through making teaching objectives and learning goals have levels, stages and characteristics, we train students' sense of purpose, to make the learning process can be controlled and have laws and rules to follow.

### **Reforming innovation system and establishing open teaching**

Compared with the new techniques and the new instrument, the pharmaceutical practical instrument analysis experiments often adopt the general teaching material, and the content is usually relatively backward, so students' enthusiasm is not very high. Due to the rapid development of modern instruments, the existing equipments of the school gradually began to fall behind, and be unable to meet the selection of a number of new experimental content. So we take the real working task as the carrier to design green learning situation, establish environment which is suitable for students learn autonomously, to cultivate students' collaborative analysis and abilities to solve problem, and it changed the original issues and exercises teaching system as well as the traditional assessment approach. At the same time, we set up the teaching research group, to strengthen the researches of

teaching theory and approach in the teaching process of instrumental analysis teaching to improve the teaching reform ability of the professional team.

We have changed the traditional "straight line" teaching method, and adopted the deductive classroom teaching model, the task-driven teaching model and the question teaching model. These models not only pay attention to students' independent discovery and experience, but highlight the study process in the research. This model makes the students in a more active position in the class, and changed the students' passive information acceptance situation in the traditional teaching process completely, and it can stimulate the enthusiasm and creativity of students effectively. For example, by using flip class can make students preview before class actively and overthrow the traditional linear teaching method, and it realize the aim which takes the teacher as a guide and students as the main body, and it inspired students; enthusiasm and creativity effectively.

We encourage students to make full use of the library, network, media and other resources, and understand and grasp the principle and application of various advanced instruments actively, to revise the existing pharmaceutical analysis practical instrument teaching materials, teaching syllabus, and actively carry out network courses including internet courseware, network answering, discussion, homework in the network environment, and make use of cyber source reasonably, broaden the students' knowledge, and optimize as well as build up the ways or methods that students acquire knowledge, so that students can participate actively, research actively, acquire instrument analysis knowledge autonomously, get skills, cultivate abilities and accomplish comprehensive development in many aspects under the natural condition.

## **Conclusion**

With the construction of network experiment platform, the change of experimental guidance mode, engineering and innovative ideas has been gradually integrated into the process of new professional experiment reform, and the new pharmacy practice instrument analysis experimental curriculum system has been formed. It will play a very important role in promoting cultivating high quality pharmaceutical professional talents, and the graduates would have enough competitiveness and potential development in their future work. Of course, as an effective carrier that cultivating innovative professional talents, the network experiment platform construction has a long way to go. And the achievement nowadays gave us great encouragement. Next, we need to continue to explore, to meet the requirements of new situation, to cultivate more excellent innovative pharmaceutical talents for the society.

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