The Construction of Informatization for the Large-scale Instrument and Equipment Training

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ABSTRACT

The Ministry of Education published the 《Ten years development planning of informatization of education (2011-2020)》 in the 13th March 2012 and pointed out that the construction of educational information was an important symbol to evaluate the education level of universities. And it’s also an important support for the education to develop rapidly and sustainably. Large-scale equipment training in University has always mainly applied to the teachers, multimedia courseware, textbook and so on. Therefore, there are problems such as teaching is not clear and students can’t understand.

In order to promote the literacy of the information technology of teachers and students and expand the application of information teaching to meet the needs of education reform and development. National Biological Experimental Teaching Demonstration Center of Jilin University relied on the existing platform, strengthened the construction of network teaching constantly, and focused on the development of large-scale equipment training used by digital resources. This paper used multifunctional micro plate reader as an example to introduce the method and significance of network experiment construction.

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INTRODUCTION

With the construction of education information infrastructure in China, many schools in economy developed regions had built campus network that connect into internet in variety of ways. It provided hardware support for expanding teaching space. Recently, digital education resources have been richer, which expanded the radiating surface and provided software support to carry out the heuristic, discussion and participatory teaching method. In order to accelerate the development of network teaching mode and promote the construction of open online courses and platform, National Biological Experimental Teaching Demonstration Center of Jilin University (center for short) based on the existing platform to carry out large-scale equipment training using digital resources. Through the application and improvement in recent years, it has get good teaching effect.


Large-scale equipment is an important factor to measure a college's comprehensive strength. However, there are many shortcomings existing in large-scale equipment training process for undergraduates. For example, as the equipment is expensive, so students are not allowed to use the instrument, but only to look at the pictures. Though the student are beside the equipment, the number of students is large and the teaching time is short, students still can’t operate the equipment. And there are also some colleges and universities in the teaching process consider students are not skilled in operating the equipment and may cause damage easily to equipment, so they set professional teachers and laboratory technicians to operate the equipment. Thereby the student are just a spectator and still can’t operate the instrument. Above all, large-scale instrument and equipment training does not meet the purpose of teaching practice, but also failed to fulfill its personnel training responsibility.

Design Equipment Training Mode to Meet Students' Cognition

Education is a process of teaching people to think and practicing with knowledge and skills. It is very important to design the teaching mode which is in accordance with the law of students' cognition. The designing of the network teaching mode highlights the characteristics of the teacher as the leading and the students as the main body. In the training of large-scale equipment digitalization construction project, the training courses are set by resources display, item bank, self-test, part of operation, experimental results online analysis simulation and so on. In the part of resources displaying, the instrument operation is recorded as a video in detail with steps presentation and also base on the application of the instrument to set up resource development and other parts. The part of item bank is to display operating the
equipment related exercises in different forms and with relevant answers, which could deepen the understanding of the students. In the Self-test part, the students could easy to assess the error and strengthen the correction of actual operation. After the experiment students can submit the experimental results directly to the Internet and get on-line analysis results. The teacher comment on the experimental data and results analysis meanwhile. These steps improve students' interest, mobilize students' enthusiasm on experiment, and cultivate students' autonomous learning, cooperative learning and inquiry learning ability.

THE METHOD OF THE CONSTRUCTION OF DIGITAL RESOURCES

The Production of Training Video

THE PRINCIPLE OF PRODUCTION

The digital construction of large-scale instrument and equipment training can not only display the instrument operation process, but also highlight the key and difficult points, enrich the training contents and show the means colorful [4]. Firstly, it need to clear what techniques that students should master, such as using multifunctional enzyme to test fluorescence and optical absorption. According to different detection method, it can be divided into different operation module to produce. And the time of every part of the video should be controlled in 5-10 minutes which is appropriate. This way could ensure the students focus on the learning process. Secondly, it need to clear all non-experimental items that may interfere with students’ learning and avoid the unrelated things to mislead students. In addition, the production process should be showed a variety of ways, and also scroll bilingual subtitles based on the characteristics of the subject.

VIDEO PRODUCTION

The video of large-scale instrument and equipment training can use mobile phone, digital camera, DV and some other recording equipment, as well as Camtasia Studio, Screen2swf and Screen expert. Sound and picture should be synchronization, no noise defects. The picture should also be clear and vivid, no obvious distortion or too weak. Sound is clear, full and rounded, without distortion, interference noise, commentary sound, live sound, background music and some other noise.

REQUIREMENTS OF PRODUCTION

Video compression adopted the coding mode of H.264(MPEG-4 Part10: profile=main, level=3.0), Code flow rate 256 Kbps or greater, frame rate is
more than or equal to 25 FPS, resolution is more than or equal to 720 * 576 (4:3) or 1024 * 576 (16:9), and audio signal to noise ratio is equal to or more than 48 DB. Subtitles should be used in line with the National Standard Specification. Synthesizing video with a title, author, units and other information.

**Production of Other Materials**

**PRODUCTION OF TEXT**

Text contains the procedures of operating, precautions, operating skills, questions and so on, which should be produced into DOCX or DOC format. The questions can be divided into exercise, homework and self-test questions; self-test questions contains multiple-choice question and judgment question.

**MAKING PRESENTATION**

Presentation should use PPT or PPTX format, but not use PPS format. It also should avoid embedded audio, video or animation. The number of words in every page should not be too much. Text size is not less than 24 pounds. And it should use Windows system default font without special fonts. Try to avoid unnecessary combinations, as little as possible with the macro commands and do not appear when the macro command prompt.

**MAKING PICTURE**

The color image is not lower than the true color (24 colors). Gray image gray level is not less than 256. The screen resolution is not less than 1024 * 768 and images is not less than 72dpi. It always uses GIF, PNG, JPG and so on as the common storage format.

**THE SIGNIFICANCE OF THE DIGITAL RESOURCES CONSTRUCTION**

**Self-learning and Individuation Teaching**

The student learn from Internet through the mobile communication terminal and they autonomously control the learning place, time and rhythm to enjoy the fun of learning. Meanwhile they find the problem and propose in the process of learning as well as finding the way of solution. For example, recording the multifunctional micro plate operation as a video and through Jilin University Curriculum Center, courses in colleges and universities of Jilin Province Higher Education Press, Sharing Alliance Network Course Platform cloud and other platforms to run the video online. Students can learn
whenever and wherever to achieve an individuation teaching. It changes the problems happened in previous training, such as the teaching schedule constraints cause difficult to take into account the different characteristics of each student. Through online training, field operation, online analysis and discussion to make up the deficiency of traditional teaching.

Promoting Mixed Teaching By Diversified Assessment

PROBLEMS IN THE STAGE OF SETTING THE ASSESSMENT

According to the degree of difficulty of the knowledge, the large-scale equipment online training can go on from the shallow to the deep. Some relevant puzzles may come out when the students watched the video. Students can selectively answer the question and when they correct the answer to a certain percentage of the problem, then they can go on learning. This assessment stage is similar to the game of clearance. It doesn't only increase the interest of the student in learning, but also cultivate the students' ability to tackle tough problems.

CARRYING OUT ONLINE AND OFFLINE INTERACTIVE TEACHING

Teachers set up a discussion topic to guide students to discuss, which promote students cooperative learning and research learning. Teachers make online Q & A, classroom discussions and other online and offline activities to the design and coordinate. To understand the learning dynamics of students. And they guide the common and personality issues. Through the ICC platform, teachers could analyze and evaluate students’ learning activities. According to the statistical data to adjust the teaching focus and difficulty.

Exploring The Cooperation Between School and Enterprise

Using cloud courses platform of Higher Education Press for students to learn without limits to achieve sharing and interaction between schools, which expands the benefit of students and does good demonstration effect to brother colleges on talent training. For example, the contestant participate the Provincial College biological experimental skills competition could use Internet to learn instrument method in anytime and get ready for the championship. Large-scale instruments and equipment may be applied in many subjects, such as the multifunctional enzyme standard instrument relating to the subjects of medicine, food and environment. Through opening the website to strengthen the enterprise and scientific research institution resource sharing. To explore the cooperation mode between enterprise and school and promote the cultivation of College Students' innovation ability [5].
CONCLUSION

Accelerating the development of information education is also facing many difficulties and challenges, the effective mechanism of digital education resources sharing has not been formed and the high-quality educational resource is particular insufficient [6]. Network experimental construction is a great significance to promote the education informationization and education reform. Let us work together to build digital resources and promote the process of educational information.

REFERENCES

1. Ministry of Education. Comments on the application and management of the Ministry of education on strengthening the construction of online open courses in Colleges and Universities. 2015, 4, [Z], NO. 3.