Teaching Mode Innovation and Practice Based on Information System

Bo Xu, Weiwei Chen, Bo Liu
Institute of Command Information System, PLA Univ. of Sci. & Tech., Nanjing 210007, China
Lei Meng
Department of Foreign Training, PLA Univ. of Sci. & Tech., Nanjing 210007, China

ABSTRACT: In order to improve teaching efficiency and quality of personnel training, this essay studies course teaching mode based on information systems, and proposes teaching methods based on scientific thinking. On the basis of this concept, ourCourse2.0 network teaching system is developed. In the aspects of teaching, learning and management methods, this study focuses on enhancing teaching mode innovation, learning motivation, and capability in whole process management. Practice results show that the use of the system and related teaching mode could effectively enhance the teaching effect, facilitating the teaching atmosphere of student as the subject and teacher as the guide. The system fully mobilizes the enthusiasm of students and cultivate students' innovation ability and overall quality.

KEYWORDS: Teaching mode innovation; Information system; Heuristic teaching method

1 INTRODUCTION

At present, China’s higher education has entered an intensive development stage with the core of improving quality. The further round of education reform with the focus on course construction and course reform, and the in-depth integration of information systems and higher education, has been a great driving force in promoting educational reform[1]. The rapid developing MOOC is an example[2]. Military academies are training base for high-quality military personnel. It is an elite education with higher requirements for the quality of personnel training compared with civilian colleges. Especially with the implementation of the educational idea of "student-centered and teacher-led", and the application of heuristic, interactive, case-based, and inquiry teaching methods, how to improve teaching efficiency and quality with the development trend of the times, how to combine “teaching” and “learning”, and how to actively build new teaching Modes with teaching resource sharing, frequent teacher-student interaction, highly efficient process management, are the focus of our research.

"Sharp tools make good work." According to the needs of personnel training of military academy and combined with years of teaching reform experience, this essay analyzes the limitations of the traditional teaching mode and characteristics of mainstream teaching information systems. With the trend of international educational informationization, we have designed and developed ourCourse2.0 network teaching system[3]. By using advanced networks information technology, a variety of teaching modes, effective management and flexible user interface are formed. The instructors, students, the teaching management staff are integrated into a unified management platform which provides an information highway for teaching interaction and management interaction. The three-stage model of teaching resource management, curriculum management and teaching process management are scientifically designed. The teaching would cover three steps of before-, in- and after-class, It enables classroom teaching, lab teaching and innovation. It builds a whole process-oriented learning evaluation method. It is easy to evaluate the effectiveness of (e.g. participation time, rate, effect and test) learning and teaching. In addition, it provides students with an innovation platform, and promotes the teaching quality, learning effect, and management efficiency[4].

2 TEACHING REFORM AND INNOVATION BASED ON INFORMATION SYSTEM

2.1 Research-based teaching with the heuristic teaching mode

Adhering to the "student-centered, teacher-led" idea, teacher emphasize on the learning process in order to improve the quality of teaching. Heuristic teaching, discussion, and interaction transform the "indoctrination process" into the "discovery" of knowledge. Study groups and test groups transform individual learning into cooperative team learning. Course reports, research experiments and
extracurricular scientific and technological innovation transform passive learning into active learning. The "teaching" would promote "learning" and inspire students’ autonomous, inquiry and constructive learning. It would effectively mobilize the initiative of students, and inspire students to think independently. As well, it would develop their logical thinking ability, and develop the ability to solve problems independently.\(^5\)

ourCourse2.0 provides before-, in- and after-class teaching content making function. In the teaching process, a heuristic teaching method of "three points and one line, problem-propelled" is used. Teacher could prepare lessons, make network course and textbook, and build network course system. Students and teachers could get rid out of space and time constraints. Students’ self-learning ability would be enhanced. And it could facilitate the development of heuristic teaching. Figure 1 is a schematic heuristic teaching method.

![Heuristic Teaching Method](image)

Figure 1. Heuristic Teaching Method.

There are three key points to be noticed: (1) problems conjecture, (2) facts verification, and (3) rational thought. In before-class stage, the discussion is made about the key knowledge. Through information searching, PPT making, discussion and presentation, students would fully play the subjective initiative. In classroom, students would learn and make research about the key knowledge under the guidance of the teacher in the form of group discussion and exchanges. With the instruction and experiment, the knowledge would be verified. In after-class stage, inquiry-based learning and practice would improve the capability and the knowledge would be transformed into ability.

2.2 Realization of the whole process management

Traditional teaching mode is only concerned about the objective scores of students learning, while ignoring the whole learning process. Only at the end of the course, the learning effect would be evaluated, missing the best time of study. ourCourse2.0 teaching system would make whole process management and the instructor could focus on every aspect of student learning. The problem would be identified and solved timely. Students would complete the course learning according to the teacher’s plan.\(^6\)

Figure 2 is a schematic view of the whole teaching process management. In this process, teachers could use the system to record every aspect of students’ learning, including students’ participation in teaching activities and objective and subjective evaluations. Therefore, the teacher could make a comprehensive evaluation of students’ learning quality and outcomes, and could discover the problems in teaching, so as to adjust the teaching content and methods. Teaching management branch could supervise the teaching process and make quantitative assessment of teaching content and teaching effect. Through the whole process managing, the learning and teaching would be promoted.

In order to solve problems caused by poor preview, such as low classroom efficiency, ineffective teacher-student interaction, and affected heuristic teaching effect, teachers could use ourCourse2.0 to know students’ preview time and to evaluate the preview effect. In the teaching process, teacher could make subjective evaluation of learning attitude based on classroom performance, notes and group discussions, and give a reference score. In addition, objective evaluation of learning effect would be made based on homework, experimental scores and test scores. The qualitative scoring of each learning step would provide whole process supervision.

2.3 The wide application of incentives to stimulate the students enthusiasm for learning

On the basis of whole teaching process management, the instructor could observe and record the performance of students at any time. This evaluation stemmed from the learning process itself will help to stimulate internal motivation, and promote students’ self-monitoring and regulation.\(^3\) Based on teaching experience, a variety of different incentives are put forward and applied as shown in Figure 3.

Regular group discussions would reflect learning outcomes and help the teacher to know the learning effect. The group discussion could be videoed and released, so that more people could see outstanding students, which will promote student enthusiasm for discussions. The teacher could display the best homework and experimental results, setting a good example and facilitating communication between students. In classroom, the teacher should encourage and praise students who have good performance, in order to increase their self-confidence and to
encourage more participation in classroom. Based on
the whole process management, the teacher could
periodically publish students’ comprehensive
ranking, changing "score evaluation" into "scores
incentives" to stimulate students’ learning initiative.

![Figure 3. Incentives of Different Learning Stages.](image)

2.4 Accurate and intelligent testing

The primary means of checking the effect of
classroom activities is the proficiency test. To this
end, ourCourse2.0 network teaching system provides
a full-featured online test questions management and
analysis functions, shown in Figure 4. Through the
reform of course examination mode, the
transformation has been made from one-time course
exam into whole process evaluation, which is to
achieve a change from "results-emphasized" into
"process-emphasized".

![Figure 4. Modes of Exam Question Management and Analysis.](image)

In ourCourse2.0 teaching system, each of the test
results could be directly rapid feedback to teachers.
It could be taken as the evaluation of teaching effect
in the previous stages, so that teachers can timely
adjust and improve teaching content. The system
provides questions input, and binding of questions
and knowledge. In the aspect of test forming, the
system assigns homework, chapter test, knowledge
point test, midterm and final test. The system can
provide automatic scoring, manual scoring and
teaching analysis. These features not only greatly
enhance the teaching quality and efficiency, but also
promote students’ self-learning, saving time, saving
manpower and financial resources to make the test
results more objective and fair.

2.5 Relying on resource sharing mechanism to
promote the teaching reform achievements

Currently, colleges and universities, while having
some teaching resource sharing mechanism and the
responding software system, are capable of
teaching resources, lesson plans, courseware, test
libraries shared between teachers and students. But
this simple resource sharing has certain limitations,
it cannot be quickly and easily disseminate excellent
teachers teaching ideas, teaching methods and
teaching mode. We propose, in ourCourse2.0
education system, resource sharing mechanism
based on network education system. The course is
divided into teaching and resource sharing. The 3
phases of the cycle interactive mode of teaching
curriculum content management and implementation
of process management, change "curriculum
resource library "to" teaching knowledge bank ", its
architecture is shown in Figure 5.

![Figure 5. Resource sharing mechanism based on network teaching system.](image)

Compared with traditional resource sharing, after
the teacher put in course resource, each class would
be designed. For excellent instructor, the teaching
designing is based on years of experience and the
system is a knowledge repertoire. With network
teaching platform, you can copy all the resources
of courses, including the above-mentioned "knowledge
repertoire" to enhance the overall level of teaching.
With the above resource sharing mechanism,
excellent teaching methods and resources would be
quickly spread among teachers, which would
provide a platform for the expand of construction the
course.

3 CONCLUSION

With the development of information technology,
traditional teaching model reflects its inherent flaws.
In order to improve learning effect, to strengthen
teacher-student exchanges, and to improve students'innovative ability, the teaching mode reform based
on information system is proposed and the
ourCourse2.0 network teaching system comes into
being. Moreover, the system is remarkably applied
in many courses, such as "principles of computer
networks". We will continue to carry out extensive
and in-depth study, to constantly optimize the
system and instructional design, to expand students' learning fields and achieve a broader platform for learning and teaching.

REFERENCES