

Practice and Thoughts on Open Online Courses and Mobile Cloud Classroom Construction in Advanced Mathematics

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Abstract. Based on the practice of open online courses' teaching reform in "Advanced Mathematics", this thesis analyzes the significance of the open online courses of "Advanced Mathematics" and the construction of mobile cloud classroom and forms a characteristic analysis of the teaching reform project. It also reflects on and improves the teaching practice of open online courses, which promotes the improvement of the effect of the curriculum and enhances the mathematical science quality of college students.

Introduction

"Advanced Mathematics" is an important basic course of public mathematics offered by science and engineering majors in higher education institutions. With the rapid development of computer and network communication technology, the "Advanced Mathematics" courses present an increasingly rich teaching model. From "MOOC class", "SPOC course" to "micro-course", "flip classroom", great changes have taken place in the teacher's teaching method and the student's learning method [1]. On the basis of the open online courses developed by my school, this thesis conducts a more comprehensive and in-depth study of the open online courses of "Advanced Mathematics" and the construction of cloud classroom. I strive to take the construction and application of open online courses as the starting point and carry out the reform of the "Advanced Mathematics" course inquiry and information-based teaching methods, which aims at promoting the educational innovation of deep integration between modern information technology and teaching, such as "Internet +", big data technology. Thereby, the teaching objectives of "student-centered, ability-oriented" university can be achieved and the common development of teachers and students can be promoted. It is not only a great opportunity to grasp the education and teaching reform of higher education in the new era, but also a strong motivation to meet the major challenges of education and teaching reform in higher education in the new era [2].

The Significance of Online Open Course and Mobile Cloud Classroom Construction in "Advanced Mathematics"

Only by Adhering to the "Student-centered" Teaching Mode can we Achieve Excellence in Education

Traditional Chinese education culture emphasizes "preaching, teaching and dispelling puzzles", highlights the teacher-centered teaching type teaching mode, which is to ensure the systematization of knowledge structure and teaching content. This teaching process shows the compliance and inheritance for traditional culture, but it neglects cultivating learners' critical thinking and the ability of innovation. The lack of effective communication and exchanges between teachers and students leads to the emergence of a teaching mode which only emphasis on knowledge transfer. In the 1950s, Carl Rogers first proposed the idea of "student-centered" teaching and emphasized that "students are

the main body and teachers are the leading". Teachers and students interact closely in teaching activities and they pursuit for mutual promotion and common development.

The core task of university is talent cultivation, and the essence of university teaching should be "student-centered and ability-oriented" research-based teaching which is benefit to guiding students' autonomous learning and research-based learning. Carrying out the reform of "student-centered" teaching mode and doing teaching research, teaching design and teaching organization are the basic and inevitable way to realize the education goals for transforming from knowledge transmission to ability cultivation. They are also the fundamental requirements to cultivate outstanding talents with innovatory spirit in the new era.

The Development of Online Open Courses and the Creation of Mobile Teaching Information Platform are the Key to Improve the Reform and Innovation of Teaching Mode and the Quality of Talent Cultivation

Online open course learning fully embodies the characteristics of "Internet +" in the new era. The wide application and sharing of online open course learning is conducive to the full implementation of quality education, effective integration of general education and professional education, the theory and practice, in-class and after-class education resources. The learning mode has significant openness of educational resources, guarantees the right and opportunity for learners to learn independently and fully supports the students' individualized learning.

Creating an "omni-directional, three-dimensional and intelligent" mobile teaching information platform, introducing "rain classroom" teaching APP and organizing cloud class are beneficial to realize the construction and application of online open courses and to promote hybrid teaching and classroom flipped. They give full play to the efficiency of online courses and promote the reform of "student-centered" teaching mode [3].

The Construction Practice of Online Open Course and Mobile Cloud Classroom in "Advanced Mathematics"

(1) Optimize the curriculum content, improve the teaching system in "Advanced Mathematics", gathering knowledge points that can implement the discussion and case teaching, design teaching links and teaching methods combining online course technology and cloud class teaching platform, and create "Internet +" three-dimensional teaching resources.

(2) Update and improve the courseware and teaching video materials of the online open course in "Advanced Mathematics", collect and organize the high-quality teaching resources of "Advanced Mathematics" on the "i-course" website, and use the "Rain Classroom" APP teaching platform. Promote the online and maintenance of the teaching videos of Advanced Mathematics.

(3) Set up a cloud class for the "Advanced Mathematics" and complete the mobile cloud teaching according to the course requirements. Collect and analyze the teaching data of the cloud class, implement cloud class management and assessment for students' learning, and realize multi-process, multi-module analysis, evaluation and assessment.

The Analysis on the Characteristics of Online Open Course and Mobile Cloud Classroom Construction in "Advanced Mathematics"

The "Student-centered" Teaching Concept Runs through the Whole Process of Teaching Reform

This project is based on the top priority of higher education. Adhere to the "student-centered" teaching philosophy, it starts from the online open course resources of "Advanced Mathematics". In the process of teaching, we have set up the cloud teaching class, created a "flip classroom" and realized the online and offline mixed teaching to promote the common development of teachers and students.

Practice the "Internet +" and "Three-dimensional" Mobile Education to Promote the Perfect Integration of Traditional Classroom and High-quality Information Teaching Resources

Based on the "rain classroom" APP teaching platform, we have established a cloud class teaching environment featuring "mixed teaching" and "flip classroom". Applying teaching methods such as "discussion" and "case" to strengthen our teaching and introducing high-quality online course resources in traditional classrooms to guide students to learn independently and stimulate students' subjective initiative in learning are the focus of our project construction.

Focus on Data Research and Analysis, and Carry out Feedback-based "Internet +" teaching Mode Based on Big Data Analysis

The project makes full use of the massive data learning analysis service provided by the "i-course" website. Using a big data system, providing data analysis for curriculum construction and application for this teaching reform, constructing an innovative wisdom education evaluation model for the Internet, and promoting the further improvement of the teaching of this course and the perfect guidance of students' independent learning are all the characteristics of curriculum construction.

Evaluate Students' Learning Outcomes Objectively and Establish an Optimized and Reasonable Course Assessment Method

Online open course learning process can be recorded by transferring of data from "i-course" website. Through big data analysis, we can get an objective evaluation of the learning outcomes of students, which is facilitate to implement "teaching students in accordance with their aptitude" and differential training for teachers. This method also provides opportunities for top students to make their potential. Providing a specific set of solutions such as "giving exemption from test for the key students" can avoid students' "attempt" and "blitz" learning effectively and can achieved the "process, diversification" assessment method [4].

Follow-up Consideration and Improvement of Online Open Course Teaching Practice

An Introduction to Mathematics Experiments can be Added to the Online Open Course Teaching

Specialized math and statistical software can be featured in the online open course, such as MATLAB, SPSS software, etc. They can help students master specialized technology for processing vast amounts of data and modeling and improve students' ability to analyze and solve real-world problems.

Mathematical Culture Can be Introduced into the Online Open Course Teaching

Teachers can select relevant historical materials and create a micro-course learning video according to content in the teaching process, which is favor to enhance the interest in learning for students. Understanding the development of advanced mathematics, students can clearly recognize that the development of this discipline has undergone a dialectical thinking process from the shallower to the deeper. They are awake to the objective inevitability from finding problems to solving problems.

Conclusion

In the context of higher education in the new era, we should actively build high-quality open online courses and play online courses' effectiveness by using online teaching tools such as network technology and mobile cloud services. We should adhere to the high-performance teaching mode of "student-centered, online and offline mixed teaching", which enables traditional classroom teaching and online media teaching to be integrated. It can promote close interaction between teachers and

students and continuously optimize and strengthen students' self-learning awareness and ability. In that case, the teaching process of higher mathematics will be full of fun and aesthetic perception.

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References

- [1] L. Mu, J. Zhang, X.P. Wan. Giving play to the effectiveness of online open courses and promoting the reform of the student-centered teaching model [J]. *China University Teaching*, 6 (2017) 54-55.
- [2] Z. Xie, C.H. Zhang, J.P. Li. Analysis on online learning behaviors of MOOCs for advanced mathematics [J]. *College Mathematics*, 34(2018) 41-45.
- [3] X.Y. Li, L.L. Tian. Research on strategies for promoting teaching effect of the Micro lesson design in colleges and universities [J]. *Journal of Higher Education*, 20 (2017) 111-114.
- [4] L.G. Sun, L.P. Zhou, S.J. Li. Reform of electrical-engineering mixed classroom teaching mode based on online open courses [J]. *Education Forum*, 44 (2018) 121-122.