Teaching Reform and Practice of Material Mechanics Course Based on the Training of Creative Talents in the Era of MOOCS

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Abstract. The MOOCS technology focused school teaching mode reform, curriculum jumped to a depth of inquiry, speculative, interaction and practice; in the teaching of mechanics of materials, using numerical analysis software ANSYS, the organic integration of material mechanics teaching mode reform and the experimental teaching reform in, the establishment of a new theory of material mechanics teaching and experiment teaching system. The combination of the mixed classroom teaching mode, the combination of online and offline, the traditional teaching methods with the new means of online courses to expand, to provide a guarantee for the cultivation of students' innovative ability. Thus explore the best mode of training innovative talents. To cultivate innovative talents, to provide a reference.

Introduction

"Mechanics of materials" is our school of material forming and control engineering, mechanical design manufacturing and automation professional one of the most important basic courses, learning is the important foundation of "the principle of machines, the mechanical design, the subsequent course, is to solve the practical engineering problems important methods. To learn this course, it is important to cultivate students' learning methods and the formation of engineering concepts. With the rapid development of science and technology and the rich content of the course teaching, the teaching requirements are also getting higher and higher. But at present, the teaching content, teaching methods, teaching methods and experimental skills are difficult to meet the requirements of teaching reform and innovative talents training objectives. As we all know, in the students of lower grade stage is to learn professional courses on the basis of the critical period, in the stage of training students' innovation consciousness and practical ability, and constantly improve the students' comprehensive quality, how to in the teaching of material mechanics and experimental carry out research and innovation is very necessary, this is the starting point and the ultimate goal of this research. It can not only for students learning follow-up professional courses and lay a solid foundation to form the good habit of thinking and has sustainable development, but also for the students to learning professional course in the higher grades and ultimately the formation of professional competence to provide a good way of thinking. [1]

In recent years, MOOCS become world university curriculum innovation and development trend of the times, create the unprecedented high school, a large ring, this is the gospel of the learners in the world, but also teachers and students of higher education in China must face the challenge of the times and development opportunities. "Blended teaching" is a new trend in the development of international educational technology. Namely traditional face to face teaching and network e-learning
advantages of both binding, with strong interactive network learning platform, construction of a large number of online learning video, for students' autonomous learning; at the same time, through the face-to-face classroom interactive discussion, answering questions for students, to cultivate students' comprehensive ability. How to use MOOCS technology focused school teaching mode reform, course jumped to a depth of inquiry and speculation, the practical interaction and height, make full use of the advantage of network online teaching, and strengthen the face-to-face classroom interaction and knowledge to explore the new teaching mode, caused widespread reflection. Under the background of MOOCS, the teaching reform of material mechanics is imminent.

**MOOCS Features and Patterns**

MOOCs bring a new way of learning. MOOCs not only brings the quality of educational resources, the most important is to bring us a new teaching model and ideas, inspired us to promote the reform of teaching methods.

*First, MOOCs with the help of online video, to encourage students to learn online.*

The teaching characteristic of MOOCs is the organization mode and learning mode of the basic teaching unit, which is based on the short video and interactive exercises. According to the principles of pedagogy and cognitive psychology, promoting teachers' knowledge of subdivision, in accordance with the requirements of teaching, use of video technology, the teacher himself the best side record into video files, forming based on knowledge units established 10 minutes a short video, uploaded to the Internet in order to help the students focus, is conducive to the students' understanding and memory, improve the learning efficiency and facilitate students making use of odd time learning at any time. Cooperate with the teaching of video files related to the interactive practice and reference materials, help students to understand and consolidate the contents of the study in a timely manner.

*Second is the use of interactive MOOCs, to encourage teachers to interact with students*

The biggest convenience of the Internet is its interaction. Using the MOOCs curriculum, teachers can easily build a network interactive platform, teachers and students can use this platform to launch a discussion on the problems in the course. This discussion are completely unaffected by the time and space constraints, as long as there is a network terminal equipment, ready to be to participate in the discussion, students can get the teacher's guidance, can also see the students the insights and analysis. This form of interaction will undoubtedly extend the classroom to extra-curricular, for students to provide a platform and space.

*Third is MOOCs with the network platform, to create a positive learning atmosphere*

MOOCs through the network environment, the integration of quality education resources, for students to establish a similar learning environment with the school curriculum, teaching organization form is also similar to the school classroom. Students through the educational administration management system, choose to enroll in a course of MOOCS, teachers will join a list of students MOOCS platform, under the guidance of "advanced learning system", in accordance with the normal progress in learning to learn, in accordance with the requirements of the teacher, the timely completion of the teacher arranged homework, through each section of the exam. Current college students have strong desire for knowledge and exploration spirit, often expressed a great interest and enthusiasm for the new network technology application performance, MOOCS platform can satisfy the student to learn the ways and wishes, schools are using MOOCS with rich professional knowledge to guide students to vote to professional learning to, feel the course of charm. In addition to the teachers and students can through MOOCS platform of online communication, MOOCS will according to the
process of teaching, organization of teachers and students meet question and answer session and seminar, to sum up the course content to solve question of student learning.

**Using the Numerical Analysis Software ANSYS in the Teaching of Material Mechanics**

ANSYS finite element software package is a computer program of finite element method with a multi-purpose, is a numerical analysis software, is used to solve the structure, fluid, electric power, electromagnetic field and collision problems such as the software can. The teaching of numerical analysis software ANSYS into material mechanics, the multimedia teaching means, using its powerful modeling and analysis function analysis demonstration process and mechanics of materials. More important is that it can make full use of ANSYS in the post-processing module, dynamic display structure from loading to deformation until the destruction of the whole process, which can be understood as the mechanics laboratory always moved to the classroom very convenient to carry out on-site demonstration. And ANSYS simulation experiments of mechanics of materials process can be repeated many times, do not need consumable, it is superior to the actual experimental, students can also in repeated experiments on some mechanical phenomena of in-depth exploration and research, so as to achieve the purpose to inspire the students' creative thinking. By the ANSYS simulation software of mechanical component with different shape, which can not only improve the students' interest in learning, and enhance students' perceptual knowledge to practical engineering.\[2\].

Using the finite element analysis of the lathe spindle to explain the function of ANSYS. Application of ANSYS, it is easy to get the three-dimensional model of the spindle of the lathe, as shown in Figure 1; mesh the three-dimensional model of the spindle of the lathe, lathe spindle mesh map, as shown in Figure 2; after the loading operation, lathe spindle shape deformation diagram, as shown in Figure 3. At the same time it can get lathe spindle stress distribution isoline map, as shown in Figure 4, it can be seen that the ANSYS powerful processing function can let more abstract stress image of, to promote the understanding of students of mechanics of materials and the real meaning.\[3\].

![Figure 1. Three dimensional model of lathe spindle.](image)
Figure 2. Mesh of lathe spindle.

Figure 3. Deformation of lathe spindle.

Figure 4. The stress distribution contour of lathe spindle.
Summary

Operation of MOOCS relying on the school educational management system organization of teaching mechanics of materials. The course adopts online and in class a combination of "hybrid teaching mode", using online video learning, open forum, students self-study self-test, teachers explain the answer, organization of classroom discussion and other forms of learning, in the teaching of mechanics of materials by using the numerical analysis software ANSYS, let more abstract stress image, to promote the understanding of students of mechanics of materials and the real meaning to the great role. The theory of material mechanics teaching reform and experimental teaching reform of organic together, the students learning enthusiasm is particularly high, the ability to analyze and solve problems has been greatly improved. To cultivate innovative talents, provide a reference.

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