



MIXED-TEACHING METHOD APPLIED IN THE COURSE TEACHING OF INTRODUCTION OF ENGINEERING MECHANICS

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ABSTRACT

In view of the deficiency of lack of modern mechanics characteristics in the teaching of introduction of engineering mechanics, besides the existing textbook, we should pay attention to the combination of mechanics and other majors to makes up for the defect of leading role of classical mechanics result in the low degree of professional. Introduction of engineering mechanics is established for mechanical professional students, which is composed of micro-class, course-ware, blackboard and experiment, practice and demonstration to reflect the interaction between teachers and students' innovation and forward-looking of teaching. This new type can improve students' understanding to mechanics which is the support of engineering disciplines, can stimulate students' enthusiasm, broaden students' horizons and make students have strong foundation in mechanics, provide ideas for students when they start a business or get a job in the future.

Keywords: Mixed-teaching, Introduction of engineering mechanics, Practical application, Teaching guidance.

Introduction:

Mechanics has precursory, foundational, and supporting impacts on engineering science. Research methods and results of mechanics have strong universality to other projects. So far mechanics has been gradually integrated into other field in aboard. In terms of the UK and the USA, mechanical science, aerospace science, material science, civil engineering and biomedical science have developed rapidly, which benefits from the strong lead and support of mechanics [1]. For making full use of mechanics' advantages in teaching, the traditional model of instruction should be innovated. The traditional model of instruction is around a center of teacher, which made students to accept knowledge passively. The traditional model of instruction neglected to bring up the subjectivity and the cognitive actions of students, which made against the formation of students' divergent thinking [2]. The development of computer technology in the 1990s has promoted the innovation and progress of the traditional teaching mode. The emergence of the network teaching mode has greatly improved the students' initiative and broadened the channels of learning resources. However, due to poor network teaching supervision, coupled with limited self-control of students, teaching results are often unsatisfactory. In order to make up for the deficiency of the traditional teaching mode and the network teaching mode, the foreign training institutions put forward the concept of mixed teaching, which means to improve the teaching mode through the integration of online and offline traditional teaching [3]. Due to the high quality teaching achievement, the mixed teaching mode is gradually applied to the higher education, and achieved remarkable results. The professor named Hekekang of The Beijing Normal University advocated mixed education model the first time in the domestic. The mixed education

model combines the traditional teaching mode with the advantages of the network teaching mode. Not only played a teacher's inspiration, guidance, supervision, but also for students to provide more free learning environment, is conducive to the cultivation of innovative thinking to enhance the efficiency of learning [4-5].

Then scholars of Shanghai, Guangzhou and other places also focus on the mixed teaching model for in-depth study, and put forward their own views [6]. The advantages of mixed education model are mainly embodied in the teaching of reasonable form, the combination of traditional teaching and network teaching; teaching technology diversification, covering the video, audio, animation, courseware, graphics and other multimedia technology; teaching means novel including technical means and information technology means; teaching objectives intuitive, is the leading role of teachers and students of the overall status of the comprehensive; teaching evaluation of science, process evaluation, the results of evaluation and other comprehensive assessment of learning results. For the first time, the mixed teaching mode is applied to the teaching of the introduction of engineering mechanics. The teaching results show that the method greatly influences the learning and learning enthusiasm of the mechanical professional students, and establishes the introduction course of the mechanics for the students' System coherence is constructed to provide the conditions.

Problems existed in traditional classroom teaching:

At present, our hospital only in the teaching of mechanical undergraduate opened mechanics course, the main objective in order to improve the mechanical engineering students familiar with the professional, good occupation planning as soon as possible, so as to stimulate students'

learning enthusiasm. However, there are still many deficiencies in the past teaching practice. First of all, the existing teaching materials and teaching focus on learning the history of mechanics, the research direction, text and structured ones, and the single teaching mode, and teaching materials to explain, for many applications using only the undergraduate has theoretical mechanics and material mechanics knowledge to explain, did not increase the absorption of the latest developments at home and abroad keep pace with the times, ignoring the development of students' learning initiative and the background of Engineering application.

Again, focus on the theory and practice of light phenomenon in teaching mechanical engineering students in common, and the past mechanical confined to classical mechanics to lead, can not fully stimulate students' enthusiasm and passion for professional degree. Mechanics as a discipline characteristic of the guide and support the other engineering disciplines require us to pay attention to the theoretical research, pay more attention to the combination of mechanics and engineering application, make up for the lack of theoretical research and engineering demand interdependence.

Finally, in the teaching process of the introduction of mechanics, the traditional teaching methods can not reflect the students' dominant position in the classroom. It is bad to concentrate on the coursework PPT play and not to pay attention to students learning atmosphere. Even if the arrangement of the main body of the teaching way, it always tend to be monotonous and flow in the form. The 'questioning method' adopted in the course is too high, beyond the knowledge base and understanding ability of the students, and fails to induce the students on the spot. This kind of fixed passive way to stimulate students to learn interest has little effect.

The Implementation of the Hybrid Teaching Method:

Introduction of Engineering Mechanics is a fundamental and advanced course in cultivating engineering talents, in which the revolution is also the priority of reforming the patterns of educating talents. Considering its shortcomings, reflected by recently course set up for undergraduates, it must stimulate students' interests if establishing a hybrid teaching mode to strengthen the learning of this course. The whole thinking and method of the course is shown in figure 1. Hybrid teaching mode, which adopts the courseware, video, demonstration, micro class design, experiment and practice to practice and evaluate in a targeted way, once used in Frontier Issue teaching, which is based on Introduction of Engineering Mechanics, will fully improve the students' comprehensive ability. In the meantime, the students will have a preliminary knowledge of frontier issues and research methods, if you increase and update the latest scientific research achievements and experimental methods of this discipline appropriately, in the process of preparation, which could broad their knowledge, polish their

experimental skills and even cultivate their learning enthusiasm.

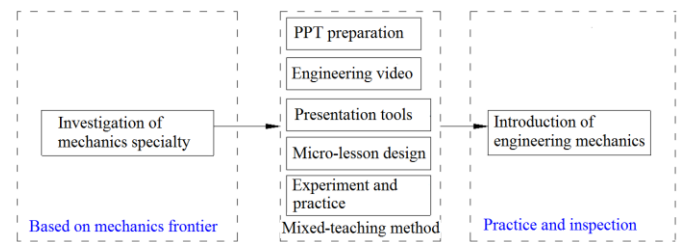


Fig.1 The whole idea and methods

(1) Curriculum designing model

In view of the background of the application of the specialty of mechanical engineering in our school, the course of the introduction of engineering mechanics is composed of ten lectures, namely, introduction, what is mechanics? China's ancient mechanics, the introduction of western learning and mechanics, the history of western mechanics, the history of the development of mechanics before and after the twentieth century, why ancient China did not have the development of science and mechanics in the twentieth century, mechanics around us and the mechanics development trend in the twenty-first century, expounding the relationship between experimental mechanics and mechanics, mechanical, civil engineering and so on, the theory of multi-field coupling and some major problems in modern engineering. All these teaching contents are international frontier problems in mechanics and they are hot and difficult in mechanics researches covering almost all the frontier research directions of mechanics in our Jiangsu University in recent years, which are closely combined with the practice of scientific research, not only an opportunity to verify the theoretical knowledge, but also to reflect the urgency of further breakthroughs in the development of the theory of knowledge.

(2) Hybrid teaching method

The main feature of this course is that professors with experiences and research achievements from different mechanical researching fields will accompany you in studying 'Introduction of Engineering Mechanics'. Those teachers are more familiar with certain research problems than the young which may increase the depth and broaden the horizon and take full advantage of the advanced education resource. Meanwhile, instead of class teaching, there are some other class forms such as micro-class teaching and experimental practice. These extra methods can enhance the interaction between teachers and students as well as simulate students' interest and passion further research in Mechanics. Moreover, this hybrid teaching method can also provide students with a platform to better understand the development of this subject and lay the foundation to cultivate student's forward thinking.



Fig.2 Microlesson teaching guidance

In the form of teaching, from the traditional classroom form to the micro-class teaching, experimental practice mixed with the teaching model, and asked students to sum up the study of the stage of the study. As shown in figure 2, the course based on super-satellite network teaching platform, according to the learning situation of each different grade students to update the relevant PPT and interpretation of the video. Using mixed teaching mode, including micro-class, courseware, blackboard and experiment, practice, presentation, etc. In addition to the traditional teaching model, the curriculum uses video display large-scale construction of the project, which can develop students' awareness of mechanical pilot, basic and supportive roles; through the rich micro-class teaching model to enhance the interaction in the teaching process, through the construction of experimental and practice platform, to further develop the practical ability of the students to understand the mechanics of professional engineering background, training students to analyze and solve problems.

(3) Examination form

In the course of the assessment methods, mainly from the examination papers and traditional classroom interaction supplemented by the evaluation system gradually transition to the volume of both performance and surface class discussion in the evaluation system; from the traditional teacher assessment of students gradually transition to the mutual assessment evaluation between teachers and students in the price system. Hybrid teaching mode for 2015 grade mechanical undergraduate students in the formal implementation, the class a total of 29 people, usually scores accounted for 30%, including classroom questions, interactive network teaching platform and group discussion, the final exam 70%, each student according to the content of interest on a piece of writing science. Compared with the students of grade 2014, the quality of interaction and the topic has been greatly improved, the class were more than 80 points, the excellent rate of more than 90 points up to 33%, therefore, the current evaluation system more scientific, it broke the

past too much emphasis on test reflects the situation, attaches great importance to the students' innovation ability this system, it will promote the development of students' practice and innovation ability.

Conclusions:

With the development of multimedia technology, a variety of modern teaching methods began to be used for teaching, the traditional teaching methods and modern teaching methods of organic integration, give full play to the advantages of cross-platform cloud and mobile media, through the mixed teaching model to students fully display the country Large-scale engineering structure in urgent need of technology and new research methods, students play a comprehensive quality education and innovation ability training role is the future development trend of teaching reform. The mechanics of our institute must seize the opportunity of historical development, cultivate more high quality and comprehensive quality talents through the mixed teaching mode, and provide the instruction for the teaching of this course and other courses.

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Author's Profile

Was born in Xiangtan City, Hunan province, China in Dec. 17, 1979. Has graduated from Jiangsu University and be a teacher in Jiangsu University. From now on began to study the hybrid teaching mode for colleges and universities and New health monitoring technology for modern structure damage.

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