Research on the Application of Research-based Learning in the Course of Stochastic Processes

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Abstract

In view of the shortcomings of the traditional teaching model, taking the stochastic process course as an example, a combination of various learning methods, reasonable implementation and evaluation, research-based learning can enhance students' professional quality and improve teaching quality. Research-based learning as a new type of teaching mode for training innovative talents in research universities is an important innovation to the traditional teaching methods. Introducing research-based learning in the teaching of colleges and universities requires strong support from the school's teaching and research resources, requiring teachers to use the advanced educational concept to lead the educational behavior and realize the transformation of the teaching mode. It also requires students to have higher learning autonomy and innovation.

Keywords

Research-based learning, Teaching mode, Stochastic process.

1. Introduction

Stochastic process is a "dynamic" random phenomenon that studies the change with "time". It is a set of random variables with parameters, in which the parameters are usually time or spatial location. At present, it has a wide range of important applications in communication, management science and biomedicine. The traditional teaching mode is dominated by teachers and supplemented by students. Teachers instill knowledge points into students according to the teaching plan, while students blindly accept it passively. This teaching mode seriously restricts students' learning initiative and enthusiasm and restricts the cultivation of students' innovative thinking. Therefore, we should change this unfavorable teaching situation and implement research-based teaching is imminent. Research teaching takes knowledge transfer as the carrier, aims at cultivating students' innovative ability and spirit, and tries to make students have the ability to analyze problems, solve problems and teamwork. This requires that in the teaching process, students should be the main and teachers should be the auxiliary. Teachers should effectively combine theoretical learning, practical exercise and exploring the unknown, fully stimulate students' subjective initiative, cultivate their learning interest and exploration spirit, and promote the improvement of students' comprehensive quality.

This paper introduces the current situation of random process course and the application of research-based learning in it, and discusses the application of research-based teaching mode in course teaching combined with its own teaching experience.

2. Current situation of "random process" course

In order to effectively carry out the reform of "random process" curriculum, we must first find out the current situation of "random process" curriculum in domestic colleges and universities. Its main current situation is as follows:

(1) The basic theories of "random process" course are many and abstract, so it is difficult to learn and understand. "Stochastic process" is based on prerequisite courses such as "advanced mathematics", "probability theory" and "mathematical statistics". The proof of many theorems not only involves the mathematical knowledge and skills of the prerequisite courses, but also is based on mean square

calculus or ITO calculus. The course of "random process" mainly requires students to analyze problems from the perspective of statistical characteristics. It is different from the thinking mode of pre mathematics course. Therefore, it is difficult to study.

(2) Lagging "random process" course textbook. Teaching materials are the foundation of curriculum teaching. In most colleges and universities in China, the course of "random process" starts relatively late, which indirectly leads to the lag of the construction of teaching materials for the course of "random process".

(3) Outdated teaching methods and means. Similar to other mathematics courses, the current teaching situation of "random process" course in Colleges and universities in China is that teachers teach the course, students listen to the course, and finish their homework after class.

In view of the above situation, combined with my teaching experience, this paper discusses some thoughts and exploration on the teaching reform of "random process".

3. Specific application methods of inquiry learning teaching strategies

3.1 Realize the integration of multimedia and traditional advantageous teaching methods

With the deepening of the new curriculum reform concept, various advanced teaching ideas have been continuously promoted in practice and have been well verified and innovated. The traditional teaching model has experienced long-term practical accumulation and continuous improvement. There are many better methods with very high efficiency, which need to be better inherited and carried forward. Modern educational technology and scientific and technological means are constantly created, It provides very good convenience for the current education and teaching reform in Colleges and universities. Multimedia has very intuitive characteristics. No matter how abstract knowledge and theory are, they can generally be displayed intuitively through multimedia, bring students a very direct experience, and exercise their thinking ability. Through the development of corresponding excellent courseware, Realize the integration of traditional teaching mode and modern educational means, and constantly explore students' learning enthusiasm, initiative and creativity

3.2 Build an after-school learning platform

With the high development of information technology, students have been able to communicate and study outside class through the network platform. Therefore, it is possible and necessary to build an after-school learning platform. In this way, teachers can use this platform to assist classroom teaching.

3.3 Diversified curriculum assessment methods

For the majors with the application of random process as the professional compulsory course, it can be assessed in combination with the students' usual extracurricular homework, attendance, classroom performance, midterm closed book examination results and final closed book examination results, give the quantitative standard and specific quantitative score of each item, and then obtain the final comprehensive evaluation result according to a certain percentage. In addition to referring to the assessment methods of professional compulsory courses, some more flexible assessment methods can also be adopted in combination with the actual situation. The assessment conclusions are assessed in five grades: excellent, good, medium, pass and fail.

3.4 Cultivating the quality of teaching and research teachers

As the leading party of teaching, teachers' professional level plays an important leading role in attracting students' attention, stimulating students' learning enthusiasm and cultivating many application-oriented talents. Therefore, cultivating high-quality teaching and research teachers is a crucial link in the teaching reform of applying stochastic process. This requires that teachers who teach the application of stochastic process should not only be familiar with the theoretical knowledge of the application of stochastic process teaching materials and understand the teaching contents of different versions, but also be able to integrate theory with practice and combine specific problems and practical examples in the fields of communication, electronics, information, finance, statistics, management and operations research.

4. Summary

Only when teachers and students participate in the teaching activity of "random process", can the best teaching effect be achieved. Teachers are the participants and organizers of classroom teaching activities. They have an in-depth understanding of students' mentality of "random process", so as to stimulate students' enthusiasm and initiative in learning. Respect students' personality, interaction and cooperation between teachers and students, equal communication, and actively establish a classroom order of "quiet but not dull, active but not chaotic". Only in this way can we enhance the attraction of "random process" teaching.

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