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Discussion on the Teaching of Experimental Design

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Abstract

Experimental design is mainly about how to reduce the test error caused by interference factors, and how to use the least amount of test data to get comprehensive and reliable test information. It is an important tool course with strong theoretical and practical. Based on the combination of teaching and practice, a targeted selection of teaching content and the use of advanced teaching methods and teaching methods, this paper proposes teaching method to stimulate students interest in learning, deepen the understanding of curriculum content and master and cultivate students' application of the technology in practice activities.

Keywords: Experimental Design; Teaching; Method; Reform

1 INTRODUCTION

The test is to investigate the results of something or the performance of something to make plans for experiments rationally and scientifically, compile test plans control experimental interference in the process of testing, and the scientific and effective treatment of the test results is related to whether the workers engaged in the experiment can obtain effective test information (He, 2004; Ren, 2009). The test design method is a modern general technology for the optimization design and analysis of the test. The technology involves agriculture, machinery, chemistry, electronics, materials, petroleum, metallurgy, transportation, electric power, water conservancy, medical and health, light industry, food and management. It is a technical method for contemporary technology and engineering personnel (Tian, Cong & Ren, 2013).

The experimental design course is a combination of theory and practice and a very practical course (Xia, 2005; Zhao, 2007). The purpose of this course is to let students understand and master the techniques of experimental design, master the use of the scientific method to arrange the experiment and process test results with minimal manpower and material consumption, obtain more and better production and scientific research in the shortest time, solve the actual production and test problems in scientific research (Tian, Cong & Wang, 2014; Wang, Cong, Tian, 2013). One of the characteristics of experimental design course is that the formula is many, the calculation is more and the calculation process is complicated. in the process of teaching, according to this characteristic, teachers often spend a lot of time on the deduction, demonstration and explanation of the calculation process. Teaching often attaches importance to theory and lacks practicality (Ma, Zheng & Cao, 2010; Zhou, Lai & Liu, 2010). In addition, due to a lot of course content and less hours of class, teaching practice could not be arranged, so the practice link is not enough attention, resulting in the disconnection between theory and practice, so that the experimental design course has lost the role of "tool" in practice. Therefore, it is particularly necessary for the teaching reform of the experimental design course.

2 MAKING PROPER USE OF THE NETWORK TO INCREASE PRACTICE TEACHING

The experimental design course should focus on the method of teaching students' experiment design and how to deal with the test data. Therefore, the second teaching class is opened up in the teaching, network technology should be used to collect and build case library of every design method extensively, and build online education resource

sharing and learning support service platform, so that students can get as many cases as possible different design methods. With the support of the network resource platform, the practice link of the machine is arranged. Under the support of the network resource platform, the practice link of the machine is arranged to use the network literature retrieval system to let the students find the corresponding engineering examples and compile the experimental scheme. This kind of practical teaching requires students to select related topics according to the method of experiment design. According to the latest engineering examples, the test plan analysis report should be written, and use PowerPoint to communicate and demonstrate in class giving full play to students' enthusiasm and initiative. Through the training of students' self learning ability, information processing ability, problem solving and analytical thinking ability, students can flexibly master experimental design methods. On the other hand, the excellent test design scheme in the practical teaching of nonphysical test will be enriched into the teaching content as a case in the teaching. On the network, tens of thousands of articles about the experiment design of scientific papers can enhance students' confidence and experience to test the design of the "tools" of course huge role in industrial and agricultural production, people's daily life, the experimental design is actually a kind of the highest level of quality improvement.

3 ADDING THE LINK OF CURRICULUM DESIGN TO IMPROVE THE EFFECTIVENESS OF TEACHING

After the theory teaching content is over, the 1-2 weeks curriculum design practice is arranged in time, and the practical teaching of physical experiment is carried out. There are no fixed experiment steps and experiment instructions in curriculum design. Teachers only give experiment contents. The experiment contents include more than 10 design topics: food formulation, food quality detection method, packaging structure design, microbial culture formula, agricultural residue detection and so on. The students set up their own teams to design test objectives according to their typical production practices or scientific research problems, compile test plans, conduct physical experiments, and process experiment data, and finally hand over in the form of curriculum design papers. Through the systematic training practice of the curriculum design, the students' ability to understand and apply the experiment optimization design technology is improved. The curriculum design score is based on practical application. The aim is to encourage students to connect with the practice of theory and improve the effectiveness of teaching.

4 ENCOURAGING SCIENTIFIC RESEARCH OF TEACHERS TO MAKE USE OF THE STUDY

While encouraging students to take the initiative to participate in the relevant practice, we should actively contact with scientific research teacher in practical research project to attract junior senior undergraduates to participate. Relying on the relevant fund project, we should provide practical space for students to practice at a high level of scientific research project for more students to use the direct experimental design curriculum knowledge to scientific test plan, effectively deal with test data, promote the combination of teaching and scientific research so that students master the basic principles and common methods of experimental design. Moreover, they could have the ability to engage in research work for the students' future employment or work independently to provide experimental design and practice platform.

5 GRASPING THE FRONTIERS OF THE DEVELOPMENT OF THE SUBJECT TO PROMOTE THE ADVANCED NATURE OF THE COURSE CONSTRUCTION

The course content of experimental design is divided into three parts: the test design technique, the regression design technique and the data processing part. The teachers of the course group should teach the relevant chapters and carry out the corresponding reform of the teaching content according to the different and actual needs of the subject. We should pay attention to the practical application of basic principles and methods of use, and the mathematical deduction can be proved to be desalinate. In addition, in the teaching process, the design methods and principles of curriculum introduction should meet the requirements of the times, keep pace with the frontiers of discipline development, and adhere to the advanced nature of curriculum construction. Teaching contents should be mostly the latest research results and the latest application examples in scientific research, production and management, such as uniform design is an optimization method published in the form of papers in recent years. The teaching method of experimental design course is to cultivate students' self learning, self-adaptive and self developing ability, inspire

students' innovative consciousness and improve scientific research ability, integrate digitalized, informational and networking characteristics into teaching.

6 ADOPTING FLEXIBLE AND DIVERSE TEACHING METHODS TO IMPROVE THE QUALITY OF TEACHING

In classroom teaching, teachers should adopt flexible teaching methods according to different teaching contents, so as to combine general lectures, special reports, classroom discussions, students' self learning and network teaching. Under the premise of ensuring the logical coherence of the subject system, the teaching materials are processed. As for the theoretical foundation and strong teaching content by teachers general teaching, teaching content is desirable to deepen and expand. It takes the inductive teaching and the students' self-study method to carry out the teaching content which is easy to understand. The hot and difficult points in the teaching content are carried out in the form of special report, application case analysis, or classroom discussion. Teachers should open up second teaching classrooms, use network technology to activate and arouse students' subjective consciousness, let students find their corresponding engineering instances, compile test plans, and passively accept and independently acquire network information for learning. And because the design and calculation forms are very large in the test design, it takes a long time to write. This course will be in some traditional chalk - blackboard teaching, which is difficult to achieve. In accordance with the principles of practicality and operability, we should design the multimedia teaching system, make electronic teaching plans, shorten the time, increase the information content in the classroom, and make the tabulation, formula normalization and analysis stylization, and vivid, image, easy for students to understand and master. In the process of making multimedia courseware, we should use the specific language such as mood, speed, posture, light color and layout effect to pursue the harmony and unity of these specific languages, pursue the artistry of teaching skills, and improve the teaching effect and quality. The teaching contents, teaching calendars, application examples and various kinds of experiment questions, which are derived from practical problems, are designed to create professional webpages and interact with students.

7 GUIDING READING EXTRACURRICULAR BOOKS TO CULTIVATE THE ABILITY OF SELF-STUDY, ANALYSIS AND INNOVATION

In general, students are mainly dependent on teachers, textbooks and classes in school, which limits their initiative and creativity to a certain extent. Reading the favorite extracurricular readings can improve the enthusiasm of the children to learn and take the initiative to absorb knowledge, which can use these knowledge to brainstorm, analyze and solve problems, so as to effectively cultivate and establish the main body consciousness, so that children can change from dependent learning to subjective learning. Students' learning in the university can be said to be the one foot of the iceberg, and this is often not enough. Reading is very important. Therefore, teachers should guide the students to read extracurricular books, arrange on the test link, using the network literature retrieval system, let the students find their own project compiled corresponding experimental program, which requires students to choose one of the thematic analysis report said according to their latest engineering examples for writing test plan. The classroom discussion requires the students to draw up the outline of the discussion in advance, and then organize the student discussions, and make a summary in the classroom according to the actual situation of the discussion. It emphasizes the cultivation of students' ability to learn self - learning, information processing, problem solving and analysis, so as to realize the fundamental change of the teaching mode.

8 USING MEANS OF COMMUNICATION TO STRENGTHEN THE UNDERSTANDING OF STUDENTS

In order to obtain the best effect of classroom teaching, communication between teachers and students is required. Then, the classroom should be a dynamic environment. The teachers and students should common participate to ensure both teaching information accessibility. For this purpose, we should adopt the following approach: (1) Question before the class: through the questions are presented before class, the teachers can understand the students' knowledge of the last class. At the same time, students can prepare the knowledge to be used in this class. (2) Classroom communication: teachers should encourage students to speak actively and participate in teaching.

Moreover, students should be guided to use mathematical methods (such as, induction method, abstraction method, guess method, combination method, analogy method, etc) so that they can gradually consciously use these methods. (3) Communication during the break: during the break, teachers should talk with students, really listen the opinions and suggestions of students for the classroom teaching and humbly accept it. (4) Communication after the class: teachers should encourage students to answer question in time, overcome the fear psychological of seeing teachers. Accordingly, some students can timely avoid to hinder the back leaning of the course because of excessive accumulation of problems. The most terrible is that some students would lose confidence in learning. Therefore, in addition to the common answer question time, for some students, answer question time should be added. In this way, teachers could fully understand and help the students to grasp the knowledge of the course.

9 OPTIMIZING THE CLASSROOM TEACHING TO DEVELOP THE STUDENTS' POTENTIAL

The above is related to some measures of optimizing teaching of experimental design, and how to further optimize the teaching of experimental design according to the actual situation of the students in the new era, the teachers need constantly thinking and exploration. Through practice, our school teaching for experimental design starts from many aspects. Such as, making proper use of the network, adding the link of curriculum design, encouraging scientific research of teachers, grasping the frontiers of the development of the subject, adopting flexible and diverse teaching methods, guiding reading extracurricular books, using means of communication, optimizing the classroom teaching and other aspects. Accordingly, the teaching content and method are constantly changed. Students are more and more able to appreciate the importance of the course. Then, students' learning enthusiasm are fully mobilized, and their creativity are stimulated to solve practical problems. Under different teaching methods of teachers, learning potential of different students are developed, mathematical thinking and logical inference ability have been developed. In recent years, the course has achieved good teaching effect and quality. Moreover, the teaching methods are obtained the recognition of the vast majority of students. In the future, we still need to continue to optimize the classroom teaching, so that students can better grasp experimental design course.

10 CONCLUSION

Based on the above mentioned in this paper, the teaching content of experimental design course is more abundant and involves more specialized fields, and it is more practical. Accordingly, it is of great theoretical significance and practical significance to cultivate outstanding talents with professional expertise and pioneering spirit, pioneering spirit and sense of times.

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