Discussion on Teaching Reform of Advanced Computer Network Course

Hanjie Zhang

1.Anshun University School of Mathematics and Computer Science, Anshun, Guizhou, 561300, China

2.Guizhou University of Finance and economics, Guiyang,Guizhou,550026,China

3.University of Sao Paulo, Philippines,Tuguegarao, Philippines , 100600

Abstract: "Advanced Computer Network" is a professional selection course to improve network skills. The purpose of this course is to enable students to understand the frontier problems, methods, development and trends in their analysis and research fields. The rapid development of Internet technology has brought many problems to the teaching of "Advanced Computer Network Course". How to establish a complete set of advanced computer network course theory and practice teaching framework for graduate students, how to design content for teaching courses, including advanced network technology topics, basic web page design principles, network practice teaching methods and paper reading seminar writing, and how to build an evaluation mechanism for the management of the entire teaching process, so as to achieve equal emphasis on basic theory and cutting-edge research, theoretical teaching and practical training, to enable graduate students to truly understand and master theoretical knowledge, improve their practical ability, and lay a solid foundation for scientific research and subsequent innovation.

Keywords: Computer network; Reform in education; Practical training; Innovation

Based on computer science and technology, software engineering and network security, computer science is a core basic course for master's and doctor's degrees. Advanced computer science courses mainly focus on the master's level. They are based on the basic theories of computer design and web analysis in the graduate stage, carefully study the technical principles of computer protocols, learn web design technology, and understand the progress of computer technology. Higher computer education can be regarded as an important part of cultivating the relationship between students' technical knowledge and technical skills. However, there are some problems in the teaching of complex computer courses, such as weak system, high level of students' skills and knowledge.

1 Problems in the teaching of advanced computer network course

1.1 The short-term and long-term objectives of the course are not clear enough. The research and reform of universal and personalized courses are insufficient. Because graduate students come from different schools or different education levels, students' network technology learning backgrounds vary greatly, which makes teaching difficult to organize from the beginning.

1.2 The cultivation of innovation ability and practical ability needs to be further rooted and strengthened in teaching. Due to the lack of practice time in higher education, this course has no practice time. To cultivate graduate students' research spirit and innovative thinking, create an environment that promotes real knowledge and the pursuit of truth, improve the cooperation skills between teachers and students, improve students' participation in teachers' research projects, and cultivate high-quality technical skills to achieve success, further implementation and research are still needed.

1.3 Improving teachers' quality and their skills and status is one of the key problems that can be solved as soon as possible. Advanced computer network course is a conceptual, practical and practical course. This course needs rigorous, high-quality and effective teachers to teach. Therefore, the learning of teaching theory is the depth and depth of learning. The overall quality of the training team has been rapidly developed and improved.

1.4 Lack of various teaching and research methods, and insufficient teaching methods and methods. How to apply various information-based means such as MOOC teaching mode, project driven, case teaching, etc. to the course teaching, so as to improve teachers' and students' understanding of participatory reading of teaching methods, subject education, teaching methods and other information methods, and improve the quality of course teaching.

1.5 The development of teaching materials needs to be improved, and the construction and education benefits are limited. In the past teaching, although there were a large number of books and courses, advanced computer network, with the rapid development of network technology, big data, and information security, it can no longer meet the needs of current education and training. It is necessary to select new teaching materials, publish high-quality teaching and research papers, and strive to become a provincial quality course.

2 Research on the reform of teaching methods and means of advanced computer network course

2.1 Theory teaching

In the design of this course, first of all, systematically study the basic concepts, principles and methods of computer science research to help students rethink the concept of computer design. The phenomenon of cross disciplinary and cross professional postgraduate enrollment is so common that there are significant differences in the academic nature of students. The development of this part of content will help students better understand professional knowledge and facilitate the development of follow-up work. Later, we will teach advanced topics in computer science, such as Internet technology, multimedia networks, network management and measurement, focusing on the main issues, basic concepts and intermediate technologies involved in these topics to help graduate students improve. Master level Internet knowledge. These topics mainly consider the natural combination of basic computer network knowledge and frontier research. On the one hand, they show the current research field, on the other hand, they also emphasize basic knowledge and the network principle involved.

Thirdly, it will focus on specific chapters, data center network, program translation and other current research fields to enhance the understanding of graduate students on computer science research, which is the theme of new network technology. In order to reflect the teaching idea and avoid falling into the strange circle of inquiry, we will explain the basic knowledge of these technologies to students and the problems solved during the training, and inspire students to realize the benefits of new network technologies. In this sense, the learning process becomes a way of thinking and creation, which will help graduate students increase their research and creativity.

2.2 Practical teaching

For a long time, there has been a problem of "emphasizing theory over practice" in higher education, and insufficient attention has been paid to how to apply academic research to practical research tasks. How to develop the best teaching method of computer learning with strong engineering background and better manage the teaching results has a significant impact on the entire teaching process. In order to achieve this goal, two practical courses will be developed in pedagogy. Some of them are similar to classroom education, which can help students better understand the theoretical content taught. For example, the application layer network technology project sets up experimental content for simulation analysis of P2P data transmission protocols, and describes the full scale of big data networks in a dedicated framework. These examination contents are closely related to the concept contents, and can be used as an important reference for professional education.

We have also developed independent assessments for all courses, also known as course design, open subject selection, covering all areas and computer technology. On the one hand, some topics are listed for students to choose, such as OPNET/NS2 based network, packet filter, firewall design and implementation, and Netflow based network traffic collection. On the other hand, postgraduate students are encouraged to contact their tutors and participate in extensive research conducted by their tutors. For example, it is common to combine academic research with scientific research through independent experiments.

In order to take advantage of students' skills and commitment, independent examinations are divided into two categories: basic level and additional assignments. On this basis, much work will be done. The examination, approval and evaluation of compulsory and comprehensive independent examinations for higher education research and the creativity generated by workload are the key points of comprehensive examination evaluation.

2.3 Classroom discussion

We introduced the education content through the literature reading report and interacted with the classroom discussion to ensure that the new fields and technologies in the education field at home and abroad are paid enough attention. Postgraduates can widely use the literature to conduct in-depth research and carry out academic activities through the literature reading report. We set up discussion links in the classroom, including paper discussion and course design discussion. In the discussion part of the paper, the most common and latest literature reading research papers in the field of computer network research are selected first. Then, the graduate students are asked to report the materials they are learning. The graduate students also encourage broader consideration of problems by discussing topics from different perspectives, and encourage the conflict between discrimination and new ideas. Postgraduates also need to rely on classroom discussion to select online issues that interest the group, read more than 5 journals or relevant literature, and complete reading reports, so as to exercise their ability to express and communicate and write papers, and develop their practical skills to "apply what they learn".

The course design seminar is similar to the process of the paper exchange seminar. After the design plan is completed, the details of the subject will be discussed and exchanged. Each graduate student will make a speech according to the topic prepared by the students. Other students will also discuss the meaning of the topic, the feasibility of the design scheme, the existing problems, etc.

Conclusion:

Advanced computer communication is a world-class computer technology and communication system, which is of great significance to scientific and engineering researchers in this field. Through these reforms, a comprehensive computer education and practical education system has been established, creating a high-level computer education system, enabling students to better understand theoretical knowledge and improve practical skills. However, computer network is a rapidly growing field, and new technologies and equipment are emerging rapidly. We should pay close attention to these new changes in the further teaching process, and continue to innovate in education, imparting knowledge and developing skills.

References:

[1] Hongmei Zhang. Discussion on Teaching Approaches of "Advanced Computer Network" Course [J]. *Journal of Guilin University of Electronic Science and Technology*, 2009.

[2] Xiaorong Cheng, Huilan Zhao, Mingquan Zhang. Research and Reform of Advanced Computer Network Course Teaching [J]. *Asia Pacific Education,* 2019 (11): 1.

[3] Hongbiao Xie, Weihua Hu, Xiao Tian, et al. Investigation and Analysis of the Teaching Reform of the "Advanced Computer Network" Course [C]. 2015 Academic Annual Meeting of Zhejiang University Computer Teaching Research Association Zhejiang University Computer Teaching Research Association, 2015.