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Cultivation and Practice of Software Design Ability of Computer Majors

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Abstract: In order to train competitive talents in computer related fields, the reform of teaching plan is based on the market demand and the training of talents.To explore the direction of personnel training, personnel training and management mechanism, we focus on solving the concept of personnel training to optimize the implementation and improvement. In this paper, we explore and practice the training mode of computer software design.We construct a new four level progressive curriculum system, strengthen the cultivation of practical ability, and construct a three-dimensional practical teaching system.It has made obvious effect in improving the software design and development ability of students majoring in computer science.Practice has proved that through the reform of teaching, it is helpful to stimulate students' interest in learning and improve their practical ability.

Key words: software design ability; practical ability teaching reform; talent training

1. Introduction

At present, China's higher education institutions are booming and their annual enrollment rate has increased year by year. In 1978, China's gross enrollment rate for higher education was only 1.55%, reaching 3.7% in 1988 and 9.76% in 1998. In 1999, university enrollment began, and the gross enrollment rate of higher education increased rapidly. 2002 reached 15%, higher education from elite education into the popular stage.In 2007, gross enrollment rate of higher education in China reached 23%.In 2010, China's higher education gross enrollment rate reached 26.5%.In 2012, China's higher education gross enrollment rate reached 30%.China's goal is to reach 36% by 2015 and 40% by 2020.In recent years, with the scale of higher education in China, education and teaching needs to be reformed.At present, the general undergraduate colleges to cultivate the main application-oriented, how to highlight the characteristics of running a school to strengthen the employment skills of college graduates to improve the practical ability of college students worthy of in-depth study.Reference [1] through the software design courses in-depth reform to achieve the cultivation of college students programming skills. Reference [2] on the computer professional college students programming ability training in-depth discussion, put forward the relevant reform measures, got a better effect. Reference [3] proposed to ACM, Blue Bridge Cup, Challenge Cup, Freescale Cup and other competition-driven, computer-related professional innovation talent training model. With the introduction of the three elements of "knowledge, ability and quality" of computer application-oriented undergraduate students, the paper analyzes the importance of "ability" elements, and puts forward how to set up the curriculum design course, , Put forward the curriculum design course teaching ideas and several effective teaching methods. Reference [5] through the "flip classroom" to develop students' self-learning ability, to a certain extent, improve the enthusiasm of students to learn. To sum up, it is of great practical significance to explore the reform of practical application ability of computer specialty college students. This paper combines the current situation of personnel training in general colleges and universities in recent years, and carries on the reform of cultivating mode of practical ability of college students.

2. Teaching reform measures

General undergraduate colleges and universities undergraduate professional training of undergraduate students, mainly focused on the application of personnel training, over the years adhere to the "high standards and strict requirements" of the school philosophy. Has made some teaching results, but there are also many problems. It is very important to carry out reasonable and effective teaching reform for this purpose. This research is based on the current situation of computer science and technology specialty, focusing on the teaching reform of professional application talents, cultivating management mechanism and cultivating ideas.

2.1 optimize the design of teaching content

Computer software technology has a wide range of applications, knowledge update fast, practical, both a solid and extensive theoretical basis and requires good practice hands and self-learning ability. In view of this feature, based on the computer science and technology undergraduate talent training program, based on the basic quality and engineering ability training as the main line, oriented to the information field market, facing the regional economic construction as the demand, adhere to the "foundation, application, practice" principle , Highlighting the ability of software development and design, in the professional teaching emphasis on both theory and practice, knowledge, ability and quality of the coordinated development of the teaching content of a substantial optimization design. In the basic ability to optimize the programming basic course, the new algorithm analysis and design, object-oriented analysis and design courses in the software design advanced theory to optimize the software engineering courses, new software testing and quality assurance, software architecture And middleware technology courses; in the integrated application of the new Java programming, system integration and project management, xml and e-commerce courses. Through a series of teaching content reform and optimization, taking into account the software design theory depth, breadth and practicality, It is more in line with the software design ability training as the core of the main line of teaching requirements.

2.2 build a new teaching curriculum system

Software design and development is the core and foundation of the cultivation of undergraduate talents in computer science and technology. Through the deep analysis of the characteristics of computer software design ability, summed up the previous teaching experience, to cultivate students' software design ability as the core, to build from the program design basis to the software development comprehensive practice of the four-tier curriculum system, each layer has a corresponding course group and Stage training objectives. (1) the basic theory layer to computer introduction, operating system, data structure, compilation principle, the principle of computer composition as the core course group, the goal is to lay the basic theoretical knowledge of computer systems. (2) the basic training layer to program design basis, data structure and algorithm as the core of the course group, the goal is to lay the basic ability to program, and initially grasp the object-oriented software design methods. (3) The advanced theory layer is the core course group of software engineering, software testing and quality assurance, software architecture and middleware technology. The goal is to master the theoretical knowledge of software architecture, software design and development and software project management for advanced application Practice lay a solid foundation. (4) integrated application layer to system integration and project management, xml and electronic services, Java programming as the core curriculum group, the goal is to application-oriented, comprehensive software design and development of comprehensive ability. Four levels of interlocking, mutual basis, from low to high, step by step, and gradually develop students good software theory and solid design and development skills for the country and society to train qualified IT talent.

2.3 strengthen the practical ability to cultivate, build three-dimensional practice teaching system

Good software design ability not only requires a deep theoretical basis, but also need a strong practical foundation. In view of the practicality of computer software technology and the rapid updating of knowledge, we have designed three-dimensional three-layer practice teaching system, including basic training layer, comprehensive training layer and practical application layer. (1) to strengthen the practice of teaching within the classroom, training students basic programming application skills based on the training layer is the basis of programming, data structure, Java programming, compiler principles and operating systems and other courses within the class composition. In the experimental design of the course, the proportion of the integrated design experiment is increased, and the proportion of the basic verification experiment is reduced. Comprehensive design of the experimental training of multiple knowledge points to deepen the overall understanding of the content of the course, but also need to submit an experimental report. Focus on the design of integrated design. The integrated training layer is composed of curriculum design, data structure and software engineering curriculum design. Through the design of small integrated projects, to cultivate the comprehensive utilization of knowledge. The implementation of curriculum design is divided into opening questions, system design, coding implementation, system testing, system evaluation and acceptance, submission of curriculum design report. Request the

completion of the group, the final reply score, rating excellent. We have reformed the curriculum design assessment, developed a specific curriculum design assessment system and assessment methods, the curriculum design assessment into a defense assessment, including the group reply and the grade of outstanding curriculum design and defense of the two processes and levels. (2) to guide the practice of extracurricular practice, training students innovative thinking ability application layer is composed of various college students competition, college students SRP training programs, college students innovation plan, graduation design, teacher research projects, engineering training and software development team and other The form of practical activities as the basis. Through various competitions, to stimulate students interest in software design and initiative to encourage students to actively participate in teacher research projects, college students innovation program, college students SRP training programs and graduation design, training and training software design and development capabilities.

2.4 Computer related subject competition

Subject competition is the comprehensive quality of college students show that students' comprehensive ability and quality is also the basic requirements of society and enterprises for college graduates, this work will help the computer-related professional application talents training. College encourages students to participate in national, provincial programming competition and electronic design competition, and has won the national first prize once, the national second prize 3 times, the provincial awards many times good results, most of the award-winning students in the junior It has been well-known qualification of a business hiring. Thus, the subject competition will undoubtedly greatly promote the teaching reform, and help the computer-related professional application-oriented personnel training, and ultimately reflect the independent college practical talents training characteristics.

2.5 certification exam

In the third and fourth year, students are encouraged to participate in the certification exams with gold content, such as Microsoft, Cisco, OR-ACLE and Huawei. In addition, the national computer software level examination and other high-end certification on the employment of students have a direct impact, but also for students to provide a competitive basis for employment. At present, the college senior students through a number of software designers, network engineers, systems integration project management engineer examinations.

2.6 to strengthen the innovation team building, cultivate graduate students collaborative innovation ability

Graduate innovation ability, including innovation consciousness, entrepreneurial spirit, collaborative innovation ability, independent innovation ability, among them collaborative innovation ability is the key [6]. In the real environment, graduate students through self-learning and research to carry out independent innovation activities, and then enhance the difficulty of innovation is difficult, more constraints, input and output of the output is disproportionate to eliminate the enthusiasm of graduate students to carry out scientific research and innovation, to curb the desire for innovation and look forward to new Results, the original needs of new knowledge. Only through the construction of graduate students as the main innovation team, so that graduate students participate in the team's collaborative innovation activities, in order to continuously improve the collaborative ability of graduate students, scientific research on the breakthrough progress. In addition, the construction of graduate innovation team not only can strengthen the cultivation of graduate students collaborative innovation ability, but also the implementation of graduate education innovation plan of the new attempt is the Ministry of education graduate education innovation project type of innovation and development. Finally, the need for the characteristics of graduate students innovation team, the establishment of a set of effective, effective incentive mechanism for graduate students to provide support services.

2.7 focus on the construction of graduate tutor team

The strength of the academic quality of the instructor and the strength of the innovation consciousness directly determine whether the innovative education can be successfully implemented and whether the students with creative potential can stand out. First, the instructor should take the initiative to adapt to the new situation, new changes, constantly update the knowledge, and constantly improve their academic level, and then, to improve the quality of education, Third, the tutor must break the boundaries between disciplines and professions. Teachers from different majors should always communicate and learn from each other. They can also absorb extracurricular and interdisciplinary experts to participate in the postgraduate guidance group. Optimize the knowledge structure of the mentor, construct a high-quality, multidisciplinary cross, resource sharing diversified mentor team, together to complete the training of innovative talents.

3. Conclusion

Through the training direction, training management mechanism and training ideas and other aspects of

teaching reform, not only further clarify the direction of the future development of the school, but also makes the application of students practical ability to significantly improve. The future work will focus on the cooperation between schools and enterprises, in strengthening the "double-qualified" teaching staff at the same time, to further improve and perfect the implementation of order-based personnel training program, so as to practice practical ability to cultivate students to find a viable path.

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