

Research on the Construction of Computer Laboratory in Colleges Based on the Cultivation of Innovative Talents

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Abstract: Computer laboratory is an important practice place for training computer professionals, which shoulders the responsibility of transporting innovative scientific and technological talents for the country. Laboratories in Colleges and universities are entities engaged in teaching or scientific research, production test and technology development. They are the basis and guarantee for personnel training and scientific research. With the increasing demand for applied professionals in society, how to train students to be innovative talents is an urgent problem for educators to explore and solve. The software and hardware environment of computer laboratory in Colleges and universities must meet the needs of training innovative and high-quality professionals. Taking the computer center laboratory as an example, this paper discusses the importance, problems, functions and significance of the laboratory in the training of applied innovative talents.

1. Introduction

Laboratories in Colleges and universities are the basis of training innovative talents. If laboratories fail to meet the standards, colleges and universities can not set up corresponding majors and courses. Colleges and universities should make a good laboratory construction plan according to the opening situation of the school, and implement various measures of teaching guarantee in advance. At the same time, we should improve the utilization rate of existing laboratories, do a good job of comprehensive use, and realize resource sharing. Laboratory construction and management level, to a certain extent, reflects the level of teaching and scientific research, but also reflects the idea of running a school. At present, many laboratories in Colleges and universities are duplicated construction by the heads of secondary departments, and the utilization rate is low, resulting in some unnecessary waste. Therefore, we should build some experimental centers for all majors of the university, such as analysis centers, computing centers and other central laboratories that can be shared, open laboratories to better serve the various tasks of experimental teaching, which is conducive to promoting the cultivation of applied innovative talents.

2. The Role of Computer Laboratory in the Training of Innovative Talents

Computer laboratory provides students with rich and creative extracurricular activities, enables students to carry out applied scientific research practice, provides students with the opportunity to enter the laboratory as soon as possible, enter the project group, contact tutors, contact professional research fields, understand the development trend and frontier topics of disciplines, and an opportunity to explore and research independently, which greatly improves students' abilities. Enthusiasm and creativity have achieved good results in practical teaching.

To provide students with a rich and diverse learning environment, the goal is to establish a computer application-oriented innovative talent training center, so that these students have solid basic computer knowledge, application ability and programming skills, and have a good spirit of collaboration, stable psychological quality and rapid on-the-spot adaptability. To enable the laboratory to provide more room for the development of innovative talents in computer application, and to select excellent students to participate in the program design contest for college students every year, encouraging students to enter the laboratory, students who have achieved excellent results will lead the next generation of students. In the rich and creative experimental activities,

students can carry out the practice of applied development. At the same time, higher requirements are put forward for the laboratory, which promotes the reform and development of the laboratory.

3. Problems in the Training of Innovative Talents in Laboratories

In recent years, due to the expansion of enrollment in Colleges and universities, the scale of colleges and universities continues to expand, but the relatively lagging of funds, equipment and teaching places, resulting in poor conditions for practical teaching in some schools, and some highly operational courses can not start because of the lack of space, equipment, which seriously affects the training of Applied innovative talents.

For a long time, our colleges and universities have emphasized theory teaching. Therefore, there is a complete set of teaching documents in theory teaching, such as syllabus, teaching plan, teaching progress, teaching plan, etc. However, there is a lack of these complete and systematic teaching documents in practice teaching, which leads to the lack of a good guarantee for the quality of part of practice teaching, which often leads to students' indigestion and inhibits students' application creation.

Experimental teaching teachers should also be an important part of the laboratory, but at present, our teachers are often only engaged in theoretical teaching and lack of experimental teaching experience. The teachers of experimental teaching often belong to the teaching assistant series. The calculation of the workload of experimental teaching is often discounted, which directly leads to teachers' reluctance to take experimental courses or even to become experimental teaching teachers. Therefore, this factor in the laboratory also affects the training of applied innovative talents.

4. The Importance of Laboratory to the Training of Innovative Talents

Laboratory is an important base of teaching in Colleges and universities. Academician Feng Duan once said that "Laboratory is the cradle of cultivating innovative talents and the heart of modern universities". For example, colleges and universities encourage students to actively participate in the laboratory, support students in the laboratory product development, promotion of scientific research results, and encourage students to participate in scientific research, subject competitions, inventions and other activities, and to participate in such activities to obtain incentives converted into their elective course scores into records. Colleges and universities encourage undergraduates to carry out extracurricular scientific research activities, which require a good laboratory environment, but also laboratories to promote the training of innovative talents.

Experiment is the source of innovation. Without experimental ability, there will be no innovation ability. The cultivation of applied talents is inseparable from the cultivation of experimental ability. Because the laboratory plays a decisive role in the cultivation of applied innovative talents, many universities not only invest a lot of money in the construction of laboratories and supporting facilities, but also many universities further expand laboratories and build practice bases, such as cooperation between schools and enterprises, to establish multiple practice bases. According to the actual needs of employing units, schools adjust the original teaching plan appropriately and strengthen the employment of personnel. The technical and managerial knowledge urgently needed by the unit will improve the students' ability to work in practice.

Many colleges and universities at home and abroad have trained a large number of computer application talents through computer laboratories, as well as many excellent talents for subject competitions. ACM International University Programming Competition is an annual competition organized by ACM. It began in 1970 and is a stage for global college students to show their problem solving ability, programming ability and teamwork ability. Since 1996, universities in mainland China have participated in the ACM/ICPC Asian preliminary competition. Many universities have established ACM clubs and have accumulated a lot of experience and achieved good results in establishing corresponding laboratories. This is inseparable from the construction and research of laboratories.

5. Analysis of Computer Laboratory and Innovative Talents Training

5.1 Research Topics

Computer laboratories should constantly adapt to the situation of higher education reform and development, undertake the teaching tasks of computer public basic courses for college students, basic courses, specialized courses and elective courses for computer experiments for various majors, and make contributions to the cultivation of innovative talents in Colleges and universities. In this regard, the problems that need to be studied are as follows:

- (1) The ability and concrete manifestation of Applied Innovative Talents in computer application;
- (2) The relationship between computer laboratory and the cultivation of students' applied ability;
- (3) The relationship between the construction of open, interconnected and shared computer laboratories and the training of applied innovative talents;
- (4) Research on the relationship between the opening of experimental and practical courses and laboratories of computer and related professional groups;
- (5) Research on the role and role of experimental teachers in the training of laboratory and applied innovative talents.

5.2 Research methods

(1) Investigation and research. We can absorb the experience and exchange with other colleges and universities which have successful cases in cultivating applied talents by investigating, researching and studying.

(2) Questionnaire survey. Through the return visit of computer graduates, the questionnaire is issued to understand the experience of graduates in enterprises and their opinions and suggestions on school education. Information feedback will be helpful to the study of the role of the laboratory.

(3) Symposium. To organize the leaders of information centers such as theoretical and experimental teaching teachers of relevant computer basic courses and specialized courses, enterprises and institutions, to discuss the current situation and existing problems of computer application-oriented talents, and the knowledge structure of computer application of graduates in employing units, so as to understand the requirements of laboratory settings, so as to better and timely adjust the effect of experimental teaching. .

(4) Comparative study. Through the comparative study of curriculum, teaching methods and teacher training, the relationship between laboratory teaching and student training is analyzed.

5.3 Research Contents

(1) The computer laboratory aims at cultivating the comprehensive application and innovation ability of University Students' computers, and carries out research on the position and role of the laboratory in the training of applied innovative talents from three levels of experimental education, innovative education and skill education; studies the training needs of different majors, individual learning needs of different students for computer experiments, and also promotes the laboratory. In order to strengthen practice and highlight the status of experimental teaching, we should strengthen employment and entrepreneurship training and extracurricular innovative activities according to the requirements of training applied talents.

(2) To study the relationship between laboratory teaching environment (including hardware, software and humanities) and the cultivation of applied innovative talents. According to the characteristics of students' knowledge structure in different grades, experimental teaching is organized in three levels: computer basic experiment, program development experiment, hardware platform experiment, familiarity with the use of software interface, so that students can master basic operating skills. For example, in the course of "Software Programming", computer room can build C language development, Java program development, Python program development, Oracle database development. Development and other platforms. In the experiment of "Network Construction and Maintenance", routers, switches, firewalls, cloud devices can be purchased for networking. The experiment of Graphic Image Processing can install web page production software such as JSP, PHP, Flash animation, 3D MAX, Photoshop and other image processing software.

Students can use these resources of the laboratory to develop their subjective initiative, expand their own training experimental projects and improve their innovative ability. The direct connection between computer room and the cultivation of innovative talents is shown in Figure 1.

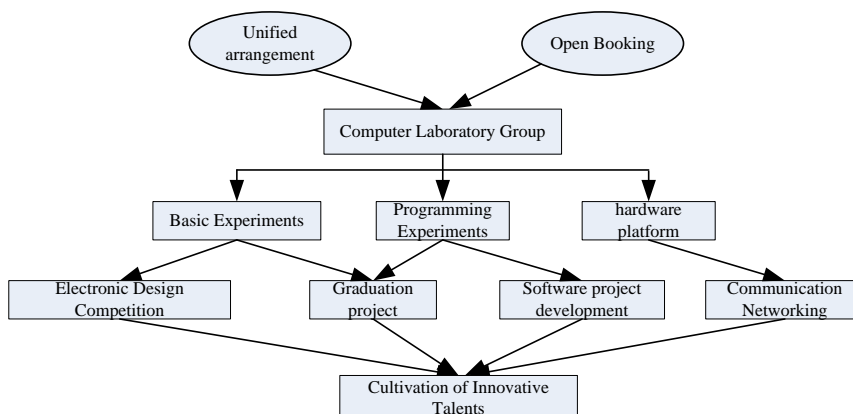


Figure 1. A schematic diagram of training innovative talents by using computer room cluster

(3) The school encourages all experimental teaching centers to make full use of laboratory resources, give full play to students' autonomy, and realize personalized training. Laboratories are open, interconnected and shared, including time, space and content. The experiment time is flexible. Students can choose the experiment time according to their actual situation. Some classrooms of computer laboratory can enter the laboratory at any time during the teaching time. Computer laboratories are integrated into computer rooms of different disciplines, including the original basic laboratories and professional laboratories. They are open to students in our university. Some specialized laboratories are open by appointment. The laboratories are open to students after timely preparation according to students' needs, aiming at innovative experiments within the scope of non-experimental teaching contents. Through the network platform, expand the experimental space, students can conduct experimental preview online. Provide a list of experiments, students according to their specialty, interest and needs, through the information network platform, students can choose their own personalized experiments. Students can also participate in independent experiments (including various competitions, teacher topics, graduation projects), and teachers can participate in guidance when necessary. The laboratory is open to the students of the National College Students Innovation Experiment Plan, the School Innovation Fund, the Key Laboratory Open Fund, and various subject competitions, extracurricular science and technology activities. The computer laboratory will still be open to the students outside the experimental teaching time, including weekends, statutory holidays, winter and summer holidays. Students can make full use of the extra-curricular time to carry out innovative practice activities. . This not only meets the needs of individualized education, but also stimulates students' enthusiasm for active learning, improves students' scientific experimental quality, and creates a high-quality experimental environment for guaranteeing higher teaching quality and making students with higher abilities stand out in the situation of higher education becoming popular. According to the need, open management measures have been formulated, open laboratory rules have been formulated, and schools have relevant incentives for students to ensure the implementation of open experiments. Many students can take part in open experiments during their rest time. The opening of laboratories mobilizes students' enthusiasm and initiative in learning, and cultivates students' practical ability, analytical ability, solving ability and innovative ability.

(4) Research on the relationship between the experiment and the laboratory of the relevant professional groups in computer experiments and the setting up of training courses. In order to achieve the goal of experimental teaching, we will give full play to the functions of the laboratory in all aspects and study the following laboratory teaching modes: emphasizing on examining students' comprehensive practical abilities such as experimental design ability, practical ability, analysis and processing ability of experimental data, and writing ability of experimental reports; according to the nature of experimental teaching, the emphasis of assessment is also different, and innovative links

are also studied. Emphasis is laid on the assessment of the process, and on the other links, on the assessment of the results. According to the opening form of the experiment, the experimental course belongs to the theoretical course and the independent experimental course, two corresponding assessment methods are adopted. The experiment belongs to the theory course, and the experimental results are proportional as a part of the theoretical course achievements; the comprehensive design and innovative research experiments with independent courses are independently assessed and scored.

(5) Research on the role of laboratory teachers in training applied and innovative talents. In the laboratory, we should attach importance to the cultivation of teachers, improve the professional level of teachers, build an experimental teaching team with new ideas, high quality, strong ability and young and middle-aged as the main body, so as to provide better guidance for the cultivation of applied talents. Professors and doctors are encouraged to enter laboratory teaching to provide guidance for the training of applied innovative talents.

6. Conclusion

Strengthening the construction of computer laboratory is not a temporary matter, but a long-term, systematic project. It has a long way to go. It needs the inclination of school policy and the hard work of laboratory personnel themselves. The development of computer laboratories is directly related to the development of schools and the realization of the goal of personnel training. Therefore, computer laboratories should clearly strengthen the practical significance and sense of urgency of laboratory construction, constantly pooling ideas, exploring and practicing a feasible way suitable for the orderly development of laboratories.

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