

# Research on the Reform Strategy of Applied Practice Undergraduate Computer Practice Teaching in Inner Mongolia

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**Abstract** Practice teaching plays an irreplaceable role in the teaching of computer majors in colleges and universities. Under this background, it is very important for universities to actively improve the practice teaching mode and promote the reform of computer major teaching to highlight the training characteristics of "application talents". This paper analyzes some common problems encountered in the computer practical teaching in the undergraduate colleges and universities in the transitional stage of Inner Mongolia, and puts forward some reform strategies for these problems.

## 1. Introduction

In 2005, the Ministry of Education issued the "Several Opinions on Further Strengthening the Work of Undergraduate Schools in Colleges and Universities". Article 10 proposes to vigorously strengthen practical teaching and effectively improve the practical ability of college students. In this report, practical teaching is clearly regarded as a key indicator for the evaluation of teaching work. It can be seen that practical teaching plays an important role in the teaching of colleges and universities[1]. In the decision of the State Council on accelerating the development of modern vocational education in 2014, it was explicitly proposed to explore vocational education at the undergraduate level and guide a group of undergraduate higher education institutions to transform into higher education institutions of applied technology type[2]. In 2016, Inner Mongolia also carried out transformation and construction of some colleges and universities in the region, and explored the transformation of some newly-built undergraduate colleges to applied undergraduate colleges. If schools are to be transformed, then the first thing that should be the most is the professional transformation. As a permanent major in higher education institutions, the computer major has more application-oriented attributes for the cultivation of talents. Therefore, in the training of undergraduate computer application talents, it is necessary to increase the practice teaching reform.

## 2. Existing problems in current practical teaching

### 2.1 Inadequate implementation of practical teaching courses

The theoretical class is far more than the practical class, the teaching form is too teacher-centered, the knowledge system is strong but lack of practical application, and students lack of intrinsic motivation in learning. In terms of teaching content, too much emphasis is placed on the teaching of knowledge, while the cultivation of practical ability is ignored [3]. Table 1 shows the practical teaching of several core courses of computer major in five undergraduate colleges in Inner Mongolia. It can be seen from the table that although various colleges and universities have set up practical teaching links for core courses, the practice links of some courses are not in place. Colleges and universities of 1, 2, has not been computer network curriculum courses in practice, colleges and universities of 2, 4, has not been operating system courses in practice, through research the cause of practical courses not opened, there are mainly two, the first is that there is no courses in practice of the relevant equipment and software, the second is the insufficient simulation laboratory and simulation laboratory construction. There are two main reasons for the non-opening of practice

courses through investigation. First, there are no relevant equipment and software for practice courses. The construction of simulation laboratory and simulation laboratory is insufficient. The second is that most of the teachers in related courses are theory teachers, who are unable to teach practical courses and have difficulties in practicing teaching.

Table 1 implementation of practical teaching courses in colleges

College \ Course	Programming		Data structure		Database		Computer network		Operating system	
	T	P	T	P	T	P	T	P	T	P
1	32	32	48	32	32	32	64	0	48	32
2	54	48	72	32	72	32	54	0	72	0
3	32	48	48	16	32	32	64	16	32	32
4	64	24	56	16	60	12	62	10	72	0
5	64	16	64	16	48	16	64	16	64	16

Note: T for theory and P for practice

## 2.2 Backward construction of practical teaching materials

At present, the main problems in the teaching material of computer major are obsolete teaching content, strong theory and poor operability, and the teaching material construction obviously lags behind the teaching reform [4]. At present, the classical computer textbooks selected by most colleges and universities lay too much emphasis on the theory and less on the practical operation. At the same time in the computer practice teaching material development strength obviously lacks, the existing computer teaching material generally lacks the formal practice instruction teaching material, even some do not have the necessary practice instruction teaching material. Take "digital logic" and "operating system" as an example, at present, it is almost impossible to buy suitable undergraduate teaching training textbooks, and students basically do not have formal training in the study of relevant courses. Finally, the technical standards used in computer training textbooks published by different publishing houses are relatively vague, and the operation process to achieve the purpose of practical training is not standardized. Therefore, although students achieve the final effect in the process of practical training, they do not have a deep understanding of the actual operation process and often forget how to do it. Some of the most common typesetting operations of office software, for example, have standard operating procedures. Although the corresponding functions can be realized without following the procedures, the speed is greatly reduced, and the corresponding functions may not be realized at the same time.

## 2.3 Shortage of practical teachers

Computer professional practice teaching has higher requirements for teachers than other disciplines. Teachers must be familiar with the work in the computer field to be able to guide students in a targeted manner [5]. However, most of the current practical courses are undertaken by theoretical teachers, and the teachers themselves lack practical experience, so the practice teaching effect is poor. In addition, application-based undergraduate colleges are similar to traditional undergraduate colleges in terms of teacher introduction policies, emphasizing that imported teachers should have "high academic qualifications and high degrees". Therefore, many teachers introduced have no engineering project experience and unreasonable knowledge structure. At the same time, due to the rapid development of applied undergraduate colleges in recent years, the speed of introducing teachers is far less than the increase in the number of students, and the teacher-student ratio is not balanced. Table 2 shows the student-teacher ratio of the computer departments or colleges of five undergraduate colleges in Inner Mongolia. It can be seen from the table that no matter whether the teachers are qualified for practical teaching, the number of teachers alone is seriously insufficient. Most of the full-time teachers are busy teaching, it is difficult to have a long time to work and improve in the first line of engineering.

Table 2 teacher-student ratio of each college

College	parameter students	Teachers	Teacher-student ratio
1	202	10	20.20
2	600	45	13.33
3	1090	42	25.95
4	1061	57	18.61
5	1100	67	16.42

## 2.4 Backward and insufficient practical facilities

With the enrollment expansion of higher education in China for several years, the increasing number of students has resulted in the shortage of teaching resources, inadequate teaching conditions and more prominent situation of practical teaching. For example, at present, a common situation is that because of the large increase in the number of students in Colleges and universities and the insufficient investment in computer and other equipment, many undergraduates who graduate from computer specialty have not even opened their chassis by the time of graduation. They are very unfamiliar with CPU, memory, hard disk and the actual structure of the computer. At the same time, due to the shortage of practical teaching equipment, teachers are not very active in designing comprehensive practical teaching projects, which cannot stimulate their teaching creativity. In addition, many practical projects that should be verified, integrated or designed by students cannot be carried out, and students' learning enthusiasm is not high.

## 3. Improvement measures

### 3.1 Improve practical teaching content

The ultimate purpose of reasonable reform of the existing practical teaching content is to strengthen students' understanding of basic knowledge and improve their comprehensive application ability, so as to better stimulate their initiative and creativity in learning [6]. The practice teaching program should be separated from the traditional teaching program, the content of practice teaching should serve the goal of computer specialty training, the organic integration of various skills training, the establishment of comprehensive practice teaching content and skill assessment standards, the practice of teaching separation. The total credits of practical teaching should not be less than the total credits of theoretical teaching. In the process of teaching implementation, practical teaching and theoretical teaching should go hand in hand. Practical teaching must take into account the needs of students at different levels, face up to the differences in students' personality and ability, and cultivate students' practical innovation ability in accordance with the cognitive law, gradually improve from low to high, and establish a multi-level, multi-type and multi-step progressive practical teaching system [7]. When formulating the practical teaching program, we must fully consider the needs of enterprises, take the needs of enterprises as the guidance, take ability training as the core, and adhere to school-enterprise cooperation and scientific training.

### 3.2 Strengthen the construction of practical teaching materials

The school must give prominence to the teaching material construction of computer practical training, and should actively organize teachers with rich practical teaching experience to participate in the teaching material construction, and compile corresponding teaching material suitable for computer majors in colleges and universities. As we all know, the update speed of computer software and hardware is very fast, and all kinds of application software are emerging in an endless stream. Therefore, it is necessary to shorten the revision cycle of computer training materials and timely supplement new training contents. The compilation or revision of practical teaching materials should be based on the idea of laying a solid foundation, emphasizing practice and seeking innovation, so as to optimize and integrate the course content and highlight the characteristics of computer specialized courses. The textbooks should include practical training

projects, operation specifications, technical requirements, result analysis, additional exercises, reference materials, etc.

### **3.3 Accelerate the construction of practical teachers**

Faculty is an important index to measure the conditions of running a university, and also a prerequisite for training talents [8]. In the construction of teachers, speed up the construction of "double-qualified" teachers. To formulate a reasonable talent introduction system and broaden the source channels of full-time teachers, we should not only pay attention to the introduction of highly educated talents, but also consider absorbing engineers and managers with rich practical experience from relevant enterprises and industries. Not only encourage full-time teachers to participate in engineering and technical training organized by the industry, undertake horizontal technology development, technological transformation or application development projects from enterprises, but also hire engineers or enterprise executives from enterprises or industries as part-time practical teachers. In the process of setting up the syllabus and teaching plan, the full-time teachers and the part-time teachers of the enterprise discuss and decide the teaching content. The full-time teachers are responsible for the theoretical content teaching, and the part-time teachers are responsible for the practical teaching, mutual promotion and mutual improvement. At the same time, we must ensure the treatment of part-time teachers and maintain the stability of the part-time teachers.

### **3.4 Improve practical teaching equipment through multiple channels**

Colleges and universities should pay attention to the practical teaching equipment of computer science. If there is not enough excellent teaching equipment, even if the level of teachers is high, it is impossible to complete high-quality practical teaching. Therefore, colleges and universities should introduce advanced practical teaching equipment as much as possible through various means. On the one hand, we must increase investment in the procurement of teaching facilities, regularly update the practical teaching equipment, and maintain the freshness and practicality of the content that students learn. On the other hand, we must actively expand school-enterprise cooperation and run schools, and introduce some high-level enterprises in the computer industry to participate in school operations. This not only solves the problem of insufficient funds in schools, but also introduces advanced practical equipment to meet the needs of the society. It also solves the problem of students' practical teaching, so that the knowledge they have learned can serve the enterprise well. The society, as well as advanced practical teaching equipment, can also stimulate teachers' creativity and learning ability, better carry out scientific research and teaching, and stimulate students' learning motivation and interest in learning. This will also help achieve a win-win situation for schools, students and enterprises.

## **4. Summarizes**

This paper analyzes some problems existing in the computer practice teaching in Inner Mongolia application-oriented universities and puts forward some improvement strategies. As a relatively backward province in education, great efforts should be made in the transformation and construction of colleges and universities. Under the precondition of applied talents training target and make full use of digging my own shortcomings and advantages, the modulation of the school localization and the target of profession fostering, higher professional to computer professional practice such requirement, it should be according to the construction of applied talents as the goal, allocate teaching resources, reform teaching methods, so as to develop to meet the requirements of industry to adapt to the social need of applied talents.

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