

# Learning Resources Design and Practice Course Construction of Computer Science

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**Abstract.** This article is to be practiced courses in computer science, analysis of the characteristics of modern Chinese higher educational courses and problems, computer science professional practice course development situation, for example, the introduction of teaching resources design theory, computer science conduct practice courses research, and teaching resources designed to provide a reference for curriculum reform of applied higher educational era of information technology.

## Research Background

Now the reform of practical curriculum in colleges and universities is a process of gradually improvement of teaching informatization. These colleges and universities launch teaching seminars and student symposiums to summarize teaching experience in preparation for further promoting the innovation in teaching experiment. Promote quality teaching resources sharing and diffusion of information technology education has been the goal [1].

**The Material of Practical Curriculum Is in Paper Storage.** At present, the syllabi, textbooks, teaching plan, experiment reports and other teaching materials for the practical curriculum of colleges and universities are mainly archived in paper storage. Paper teaching archives take a great much of geographical space, and it not only takes a long time to retrieve needed files, but is easy to lose in the process of transporting as well. Besides, it is difficult to realize the retrieval of file content.

**The Standards For the Practical Curriculum Are Not Unified.** There are many different kinds of practical curriculum in colleges and universities. Different practical curriculum carries out different teaching modes and there are different standards for them. Therefore, the teaching management of the practical curriculum is various, complex, and hard to form a unified specification. For example, the experiment report formats and the basic contents vary from course to course. How to regulate the practical curriculum of management? First of all, it is required to establish a unified specification, and the establishment of the specification need to analyze the characteristics, form and classification of the practical curriculum.

**The Resource of Practical Curriculum Cluster Is Not Easy to Share.** The accumulation of practical curriculum resources is a year by year process. In the process of resource accumulation, some resources are so similar that they can be reused while other resources are not the same and it is necessary to update and optimize them year by year. Realizing the resources sharing is an effective way to solve the problem. Students use experimental or theoretical curriculum design time to exercise after-school programming capabilities [2]. At present, in the actual teaching cases, it is difficult to realize barrier-free learning resources sharing between different teachers. On the one hand, teachers do not take the initiative to share resources; on the other hand it is also difficult to realize more effective use of resources sharing. How to establish a mechanism to ensure continuous accumulation and optimization of teaching resources it is a factor that need to be taken into consideration in resource design.

**The Repeated Utilization Factor of Practical Curriculum Cluster Resources Is Low.** Computer science major lays stress on the fostering of application-type technical talents, so

practical curriculum takes more than one third of the total teaching hours. The teaching and learning of experimental curriculum is in the environment of computer laboratories with network and multimedia. The practical curriculum for computer science major includes basic experimental courses, course design, practical courses, graduation design, etc. This series of courses constitute a cluster, for which a large part of the work of revising the curriculum content each year is repetitive construction and time-consuming. How to avoid affecting the accumulation of experience, information, resources and optimization of the same course in the case of teachers change? There must be a teaching management system that can effectively keep teaching resources. In order to improve the utilization of curriculum cluster resources, it is required to reduce duplication of course construction. The integration of curriculum cluster resources calls for the design of practical curriculum resources and the building of learning resources easy to share. This is the difficult point of practical curriculum reform for computer science major.

Based on the analysis of the investigative results are given the features of current practical curriculum in colleges and universities. In order to solve the above problems prominent in the process of practical teaching, teaching reform needs to introduce in advanced teaching concept, implement multimedia teaching means and draw on a series of innovative teaching application research on the construction of education information platform under the network environment and so on. In practice, teaching reform, students focus on computer system capabilities, using a systematic approach, students can APP Store, Mobile Market, Google Market and other business models, creativity [3,4]. Practice teaching allows students to understand the actual production work, understanding of theoretical knowledge, the formation of professional competence [5]. Enterprise Practice in order to fully complete the teaching and training school in advance of the enterprise to conduct research [6].

### **Learning Resources Theory**

The learning resources for practical curriculum in our research comprise information personnel, materials, laboratory equipment, technology and other resources available that provide support for practical learning. Learning objects as the current international generally accepted learning technology standards, in terms of ideas, technology, structure than the product pieces goes a step further, the international field of educational technology widely considered an important technical means to solve the digital resource sharing and reuse of education [7,8].

The classification is based on the existing available resources, and then followed by the revision of teaching materials, support system building and the reconstruction of teaching environment before forming design resources by redesigning. The learning resources for practical curriculum carried out by the design include implementation and design resources. Teachers need to make full use of design resources in the teaching process, including the specially designed learning materials such as textbooks, practical course labs, etc. and non-specially designed or available learning resources such as libraries, etc. In the design of the support system for practical curriculum it is required to carry out classification and analysis of both project and integrated resources.

The experiment data is generally kept in the form of a lab report. The data of the course design course includes software source code, software specification material, curriculum design report, etc. The check and acceptance of graduation design includes source code or hardware achievements, paper documents of theses, electronic files, etc. Different teaching modes are employed on reasonable classification of practical curriculum. The formulation of varied practical curriculum standards under the unified curriculum guidance can carry out more effective management of practical curriculum. The forms of course material and assessment should be designed according to different typical characteristics of practical.

## Design of Practical Curriculum Cluster Resources for Computer Science Major and Its Application

Future teaching resources can be dynamically generated and constantly updated [9]. Computer Science and Technology curriculum construction must be strengthened in order to develop students' creative and practical ability as the main target [10].

Since 2009, the construction of practical curriculum cluster for computer science major has experienced four years of practical application. Seminars are organized for students each semester. The staff room of teaching and research section determine to refine the practical curriculum cluster and confirm the content, items and related information resources of the practical curriculum in the discussion. The system of practical curriculum cluster resources for computer science major is finally established after several times of modification. The composition of practical curriculum cluster for computer science major is shown in Table 1.

Table 1 Composition of Practical Curriculum Cluster for Computer Science Major

	Content	Items	Information Resources
Practical curriculum cluster for computer science major	Experiment Teaching	In-class experiments of basic course and specialized course	Electronic file of Lab report
	Basic course design	C language course design; C++ program design course design Web design course design; Java language course design	Electronic courseware Electronic lesson plans
	Specialized and core courses design	Database course design; .Net technology course design MCU course design; Operating system course design	Electronic materials Electronic question bank
	Comprehensive practical curriculum design	Information system course design; Web database course design Software engineering course design; Embedded course design	Multimedia data
	Internal and external project practice	Website development; Internet application development	Project title information database
	Design of off campus internship	MIS system; ERP system; Mobile client programming	Project information database
	Graduation project	Software system development; Hardware system development; Embedded mobile phone development; Computer theory research	The classification information database

The system design of specialized practical curriculum cluster for computer science major is based on the content of practical curriculum that deepens gradually. After the design of practical curriculum of computer language program and core specialized courses, the comprehensive practical course Web database design is combined with the content of the database design and the Java language course design, and the JSP based Web development that is devised after JSP technology based on the is added in.

Through the practical curriculum resource platform the environment of the transformation from theory to application the application is created for students. The basic practical curriculum are set for the students in the first year at college/university and the specialized practical curriculum for the

second year. In the third year comprehensive practical curriculum based on the integration of the practical curriculum content of the previous two years and in the fourth year the content that combines internal and external practical curriculum can be further studied in-depth and optimized with its design and converted into results of graduation design and theses. The applicative transformation of practical curriculum resource cluster is shown in Fig. 1.

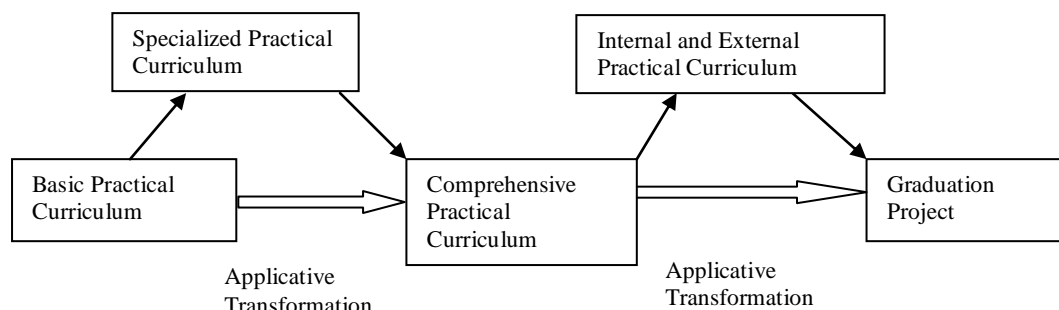


Figure 1. Applicative Transformation of Practical Curriculum Resource Cluster

## Conclusion

Nowadays, along with the rapid development of information technology, the practical curriculum resources are stored in an electronic way and the practical curriculum resource platform is constructed with the integration of practical curriculum resources. This can not only make teachers try innovative teaching, but enhance exchange and cooperation between the students for learning as well. In addition, the students also participate in the construction of resource information database of sustainable accumulation. In the future teaching process, the teachers and students should better the use of resources, accumulate teaching experience in the new teaching platform and improve teaching methods steadily to make the teaching reform more successful.

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