

Information technology-based promotion of educational resource sharing

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Abstract

Information technology (IT) has revolutionary influence on the distribution of educational resources, and it plays a role in promoting the sharing of educational resources. Based on absorbing and inheriting the results of previous studies, this dissertation proposed to collect funds to construct large-scale digital education information resource database with centring on counties without building resource centre at basic education schools at all levels. In addition, the schools shall jointly expand and enrich the central educational resources to achieve sharing and co-construction of educational resources in the region. This dissertation also constructed a model of promoting sharing of educational resources by information technology in urban and rural areas.

Keywords: Information Technology, Educational Resource, Sharing

1 Introduction

In China, the unbalanced development of elementary education is the biggest problem preventing the education sector from an entirely balanced development, and the difference between urban and rural areas in terms of educational resources and quality teacher resources directly results in inequity in students' receipt of educational opportunities and the educational quality [1]. Information technology has advantages of quick knowledge dissemination, wide coverage and sharing of resources [2], [3]. Therefore, from our national conditions, the author wishes to make full use of information technology and networking to overcome the barriers of time and space so that more people, especially those in underdeveloped areas, can share the high-quality education resources and the elementary education can make great-leap-forward development in these areas.

Since 2008, the author has assumed two Beijing educational research projects Development and Construction of IT Subject Virtual Learning Platform and Research on Digital Campus Construction and Application Practices to conduct researches on promoting the sharing of educational resources by means of information technology. Based on the fact that the information-based hardware supporting environment for elementary education in Beijing has achieved great-leap-forward development, the practical research was conducted at a county (district) level for the unified construction of educational resource centre to achieve co-construction and sharing of educational resources in a region [4]. The research was to confirm that IT could really promote the sharing of educational resources, and analyse the effect of implementation. This research will provide new methods and approaches for narrowing the educational gap in the information age and it is of great

significance on exploring the urban and rural areas' sharing in elementary education in Beijing and even all over China.

2 Model of IT-based Promotion of Regional Sharing of Educational Resource

Combined with the actual conditions that the larger gap in education resource distribution in the implementation of the "School Access to ICTs" project in our country, taking into account the fact that in next few years the focus of China's development trend in basic education informationization is the construction of digitized educational resources, and based on the theory of educational equity and the characteristics of digital educational resources [5], [6], it is suggested to take each county as centre and collect funds for the construction of large digital resource centre of basic educational information to meet the use of education, teaching and management by basic education schools at all levels in the region. The basic education schools at all levels in this region will no longer build the school's educational resource centre, instead they can directly share all resources at the county's central educational resources centre (Figure 1), in order to achieve integrated development of basic education resources and ensure that students can have equal opportunity when using educational resources.

The county's central digitized educational resources centre is designed to solve the problem of resource sharing for basic education at all levels in this area and avoid the low-level and redundant construction of resources by every school. In this way, the resources can be constructed by the county's Department of Education in a unified way. As a result, the basic education schools at all levels can be free to focus on doing a good job in

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constructing the “School Access to ICTs” project with high-speed interconnection with the central resource centre and the teachers’ IT skills training. To ensure that schools can fully share the rich resources of the county’s central resource centre, the “School Access to ICTs” project must have the basic configuration, including the high-speed network interworking with county’s and city’s central resource centres; the network connection between school’s own information collection room and studios of teachers’ CAI courseware together with network curriculum; and the computer classrooms and multimedia classrooms for students with network connection. The qualified schools can consider the network connection between teachers’ living quarters and students’ dormitory, etc.

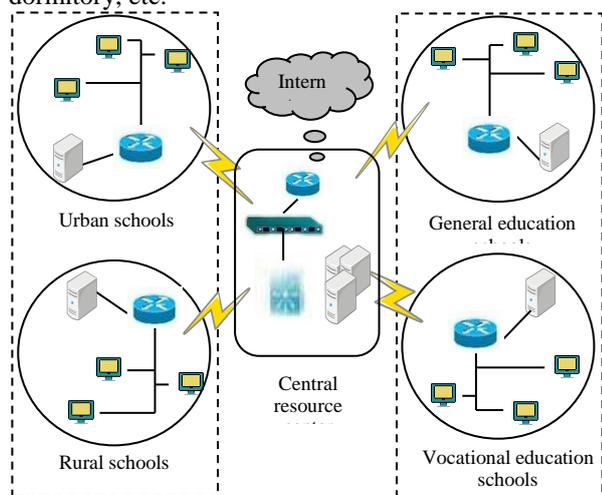


FIGURE 1 Model of IT-based Promotion of Regional Sharing of Educational Resource

3 Construction of Central Resource Centre

Linmei Liang and Xinmin Sang’s survey on the status quo and problems of regional education informationization found that the lack of overall and systemic planning and management of regional education informationization and the lack of effective mechanism for supervision and management of “investment-benefits” in regional education informationization resulted in serious waste of hardware in education informationization construction in some regions as well as the status quo of software resource lack and failure in sharing high-quality resources [7]. To advance the education informationization process equally and build regional education resource centres effectively, the focus shall be put on the overall planning and macro-management, changing from resource development orientation to the orientation of resource integration as well as joint-construction and sharing.

In order to build regional education resource centres more effectively to provide them with stronger guarantee in terms of quality, efficiency and sustainable development, etc. and give full play to the duties of the regional educational administrative departments in the

balanced development of education informationization to avoid redundant construction works, the author suggests the building of regional central resource centres for basic education. In one region, the construction of educational resources shall adopt the resource content construction mode with the organization works provided by grassroots educational administrative departments and the organization outline of local textbook knowledge or discipline catalogues. In the mode, the resources are provided by front-line teachers and supplemented by purchase, constructing in distributed way and using in shared manner.

3.1 THE CONNOTATION AND OBJECTIVES OF CENTRAL RESOURCE CENTER

The construction of educational resource centres at primary and secondary schools serve the education and teaching, and therefore they must comply with the characteristics of the primary and secondary education [8]. It is necessary to take into account not only the environment for teachers and students to take advantage of the resources but also the actual needs for resource types [9]. For regional central resource centres for primary and secondary education, its connotation can be specifically explained as follows:

First, the “School Access to ICTs” project is the premise based on which the regional central resource centres for primary and secondary schools are constructed. Only if all primary and secondary schools in the region implement the “School Access to ICTs” project, can they share the central resource centre through network.

Second, the central resource centre will permeate into the new curriculum reform of primary and secondary education. The contents of resource centre will be designed to serve the new personnel training, and the resource centre management will be aimed to ensure the normal operation and the user-friendly access.

Finally, the overall plan and the centralized financial resources for building have the profound significance to adapt to the concepts of autonomy, cooperation and inquiry learning in the network environment, improve the effectiveness of education informationization and create informationization conditions for sharing of quality educational resources in urban and rural areas. In addition, the balanced development of education informationization at primary and secondary schools can be promoted.

The core objective of constructing the regional central resource centre for basic education is to take full advantage of information technology, create changed ecological environment of teaching and learning mode in modern school education and improve the quality and efficiency of educational resources. It can help to narrow the gap between urban and rural schools’ education informationization. The construction of regional central resource centre for basic education shall be guided with

the new concept of teaching, reform concept and performance management concept, surpass the building mode of traditional resources and cultivate the creative talents who meet the needs of the information society.

3.2 OVERALL PLANNING FOR CENTRAL RESOURCE CENTER

3.2.1 Network Design Proposal

The central resource centre for primary and secondary education is mainly designed for all primary and secondary schools in the region, therefore the basic condition to ensure that schools can connect to the resource centre, and it is best to connect among schools. If there is no educational MAN built in this region, schools can only get access to the resource centre through the Internet. As a result, all individual school shall pay a lot to get access to Internet, and the single campus network is like an “isolated island of information”. It is difficult to form a network within the region. They are not able to make better communication and sharing with each other. To establish the educational MAN has the advantage that the educational institutions in the region can be connected to the network and ultimately form a regional basic framework featured interconnection, interaction, information exchange, resource sharing and remote education. The educational MAN also plays a role in adjusting the regional education layout structure, optimizing educational resource distribution and achieving the overall development of regional education. The regional central resource centre for basic education should be built in the centre of the educational MAN. The schools in the region can directly share its resources and the interconnection between the schools can be achieved.

3.2.2 Construction of Resource Centre

In accordance with the *Technical Specifications for Educational Resources Construction* issued by the Ministry of Education, the commonly used information resources include nine categories, i.e. media materials (including text, graphic/image, audio, video and animation), test question, test paper, courseware and network courseware, case, document literature, answer to FAQ, resource index and network course. In addition, other types of resources, such as e-book, tool software and movie, etc., can also be added according to the actual needs.

To fully develop and make the best of resources in the construction of education resource centre, builders must store, organize and reveal information by scientific and rational classification method that meets people’s way of thinking. There are three main classification attributes, namely discipline, applicable object and material types. These three categories are the fundamental basis for organizing resources (Figure2).

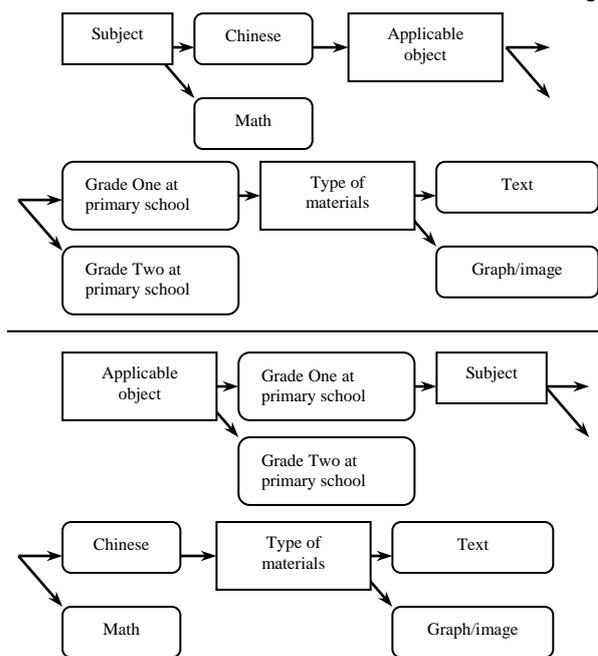


FIGURE 2 Education Resource Classification System

In fact, the construction of central resource centre is not completely from scratch, instead it is re-planned based on the integration of original high-quality resources and it is to continue to enrich resources and improve resource quality according to the new proposal standards. By combining a variety of educational resource classification theories and learning from some successful experience in building resource centre, the author proposed, in accordance with the principle of convenience for user, that the construction of regional resource centre should include four modules. They are the teaching and learning resource centre, information resources and library, the digital video library and the resource management system (Figure 3).

3.2.3 Resource centre management

The resource centre management includes resource management and system management. The resource management shall support user’s operating features on resources, while the system management is to improve the operation security of the resource centre. The functions of resource management include resource acquisition, resource retrieval, resource upload and batch data entry, examination and release of resources, resource browsing, comment entry and display, resource filing, resource downloads, and usage record tracking, etc. The system management function includes data backup, user management, network fault management, network configuration management, network charging management, statistics and analysis, as well as data releasing and sharing.

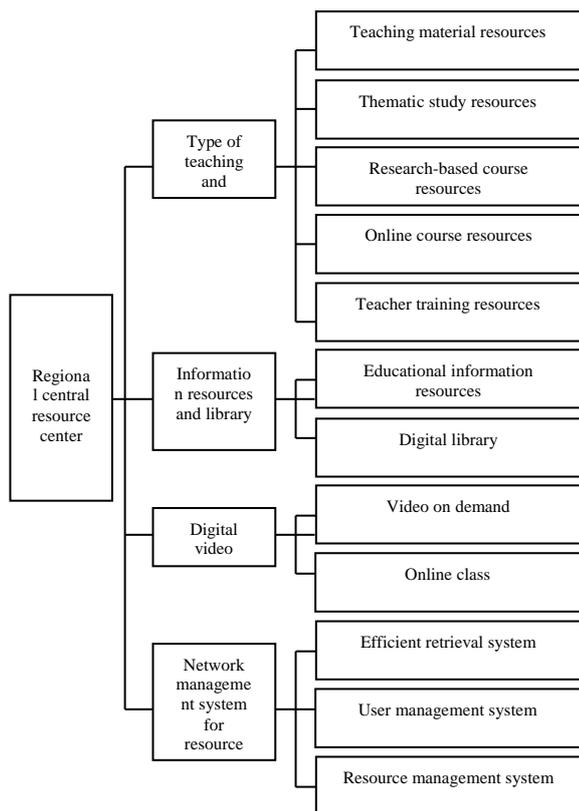


FIGURE 3 Function Module of Educational Resource Centre

For the logical structure of the management system of resource centre, please refer to Figure 4.

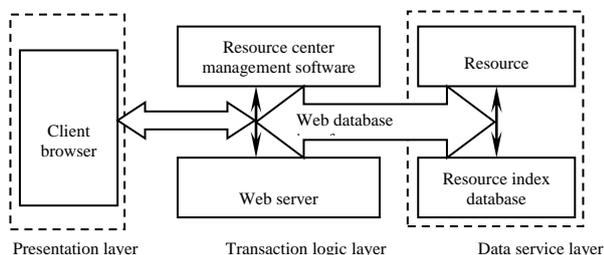


FIGURE 4 Logical Structure Chart of Resource Centre Management System

3.2.4 Application of resource centre

The ultimate goal of building resource centre is the application in teaching. Whether the resource centre can be applied flexibly and the utilization rate of resources is related to the effectiveness of resource centre construction [10]. In terms of resource centre application, the author provided two suggestions. One is to improve the user's application ability, and the other is to combine the resource centre application with the teaching reform.

To improve user's ability to use resources, training is a necessary way. The trainees should include teachers, students, technical personnel for education and teaching management personnel. Training of students should be integrated into the daily classroom teaching of information technology. The training for teaching

management personnel shall focus on getting familiar with the environment of the resource centre as well as some ideas and operations of information management. Teachers are the main user of resources, so the training for teachers is critical. Training for teachers shall include the concepts of using resource centre, the use and operation of resource centre, and, the most important one, the ability to integrate teaching by making use of resource centre. The training for teachers should adopt the mode combining theory and practice, and it shall achieve the effect of practicing while learning. During the specific training, the teachers shall be allowed to practice while learning; while when making use, teachers shall be allowed to learn while practicing. It means continuing to accumulate experience, mastering skills, enhancing concepts and thus continuing to improve the ability to use resources in the process of usage.

The role of the resource centre is not just to provide ancillary services for teaching. In fact, it is the core of teaching reform. The resource centre is not only teaching materials but also innovation works in teaching; the resource centre is not only a new form of teaching media but also new teaching communication system; the resource centre is closely associated with almost all aspects of the teaching reform. To allow the resource centre to better serve the teaching reform, we can take a series of measures, for example, the use of existing materials, the independent development of school-based teaching textbooks or localization of teaching materials; to use the resource centre to promote in-depth integration of information technology and curriculum; and to make use of the resource centre to realize distance communications between rural and urban students and teachers as well as distance education.

3.3 EVALUATION OF CENTRAL RESOURCE CENTER CONSTRUCTION

In the integration of educational resources, the central resource centre shall not only focus on quantity but also pay attention to the quality. In order to ensure the construction quality of the education and teaching resource centre, effective resource assessment mechanism should be established at macro level. Emphasis shall not only be laid on the completion of task and the achievement of verification results, but also on the assessment of all aspects of the overall process so as to standardize the construction management for resource centre and improve accuracy and reliability of verification results; at the micro level, the operating indicators for resource centre review shall be defined. The establishment of evaluation indicators shall highlight its educational characteristics and requirements for resource construction under the new curriculum standards with the fundamental starting point of quality-oriented education and innovation education.

Currently, the evaluation criterion for construction of central resource centre has not been unified yet. The

operability of various evaluation criteria is not so good. However, generally speaking, the common criteria are reflected in scientific feature, teaching, technical feature and standardization (Table 1). In addition, under the premise of conforming to the common criteria, there are

two-level evaluation indicators according to the characteristics of different resources. In general, there are a lot of evaluation criteria developed for different purposes by different departments and different people, and they have not been unified.

TABLE 1 Evaluation Principles for Central Resource Centre Construction

Principle	Requirements
Educational Principle	The fundamental principle for building resource centre. The collection and integration of any resources should work closely with education and teaching as well as subject knowledge points. It shall not only meet the needs of curriculum standards and instructional program but also have clear teaching objectives and obvious teaching effects
Scientific Principle	The technical requirements and specifications shall meet the standards published by the State. No wrongly written or mispronounced characters and ambiguous scientific errors can appear in the integrated resources. The resource classification and integration shall comply with the relevant national standards, and the resource attributes shall be marked in accordance with requirements of <i>Technical Specification for Educational Resource Construction</i>
Practical and Intuitive Principle	Construction of resource centre and integration of resources shall be easy to operate and use. Even teachers not so familiar with computer operation shall be able to easily find resources suitable for their teaching; in addition, for students who need help in learning shall be able to easily find the required learning resources
Interactive and Intelligent Principle	The content is not simple accumulation of materials or show of knowledge contents. It is more important to pay attention to its interaction and intelligence to show the cognitive involvement and the learning subjectivity in learning process
Interesting and Artistic Principle	The constructed and integrated resources shall highly interesting and can stimulate the students' motivation and interest in learning. In addition, the friendly interface featured visualization and creativity shall be provided to have strong visual appeal

4 Conclusion

Currently, China's social development has entered an unprecedented new stage. As one of the important factors that determine social development, elementary education is closely related to its era. In the information age, information technology is fully involved in the field of education, so the author advocates the information technology-based promotion of educational resource sharing to achieve the ultimate goal of closing the educational gap and finding the new ways, new approaches and new ideas to study the issue of educational equity in the information age.

The construction of central resource centre is a long-term dynamic development process, so we shall consider the dynamic and balanced development of high-quality education resources from the perspective of sustainable development. With the combination of resource construction and teaching reform and the implementation of research topics on practices of regional education informationization development accordingly, the effective use of educational resources shall be promote to accelerate in-depth reform of various disciplines; furthermore, resources shall be integrated and organized from the perspective of knowledge management while exploring the sustainable development way of resource construction.

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