Research on the Optimization of the Allocation of Educational Resources in Modern History Based on Demand Features

Hong-Gang Wang¹(✉) and Jing Xia²

¹ College of Marxism, Fuyang Normal University, Fuyang 236037, China
   wanghonggang2468@163.com
² The Research Institute of Informatization and Industrialization Integration, China Academy of Information and Communications Technology, Beijing 200001, China

Abstract. In the past optimization methods of modern history education resource allocation, there is a problem of large financial cost consumption. Therefore, the optimization method of modern history education resource allocation based on demand characteristics is proposed. Based on the analysis of the actual needs of different users for educational resources of modern history and the characteristics of educational resources they need, this paper constructs the allocation model of educational resources of modern history, optimizes each link of the model in the process of construction, optimizes the operation mechanism of educational resources allocation at the same time, implements the allocation model of educational resources in the optimized operation mechanism, and achieves the reasonable allocation of educational resources. The purpose of the source. The experimental results show that: compared with the traditional optimization method, the designed optimization method based on the demand characteristics of modern history education resource allocation consumes less financial cost, which is suitable for practical projects.

Keywords: Demand characteristics · Modern history · Educational resources · Allocation optimization

1 Introduction

The level of education development is a relatively abstract concept, which is affected by many factors such as economy, society, and history. It is an ideal method to determine the level of education development through direct measurement of education results. The indicators that reflect education results mainly include the student’s test results, the number of students at school, the enrollment rate, the graduate promotion rate, or the graduate employment rate, etc.]. However, in reality, due to the delayed, long-term, and potential of educational benefits, educational results are often difficult to accurately measure directly.
As the population is naturally distributed, there is no significant difference in the intelligence level of students in different regions, that is, there is no significant difference in the quality of students in different regions [2]. Therefore, although the richness of educational resources cannot fully represent the level of educational development, it is undeniable that there is a strong correlation between educational results and educational resources. It can be said that the greater the quantity and quality of education resources in a region, the better the local education results [3]. Therefore, people usually indirectly reflect the level of education development through the measurement of educational resource indicators such as the investment in education funds, the allocation and use of teaching equipment, the composition and treatment of teachers, and the ratio of students to teachers.

Educational resources, like all other resources, have a relationship between supply and demand [4]. The supply of educational resources is mainly provided by governments at all levels of the country, social organizations or individuals, and students and families to the sums of all levels within a certain period of time; the demand for educational resources refers to various types of educational institutions at all levels in order to conduct normal teaching activities and improve institutional resource level and education quality, and the amount of resource input required for educational reform and innovation [5]. The continuous supply of educational resources is a prerequisite for the smooth development of educational activities. However, in reality, there is always an objective contradiction between the limited supply of educational resources and the unlimited demand for educational resources. To make basic education resources balanced in supply and demand, the following conditions must be met: First, social resources or education The input of total resources into basic education should meet the actual needs of the development and reform of basic education; the second is that the resource supply of schools in all regions should gradually stabilize at a scientific and reasonable level without too much fluctuation; the third is the supply of resources There are no shortages or excesses [6]. Therefore, it is necessary to study the optimization of the allocation of educational resources, especially for modern history. Nowadays, it is becoming more and more difficult to learn and popularize modern history. Studying the optimization of the allocation of educational resources for modern history for the study of modern history is more helpful.

In the traditional optimization method of modern history education resource allocation, there is too much waste of financial resources, which has a certain impact on the local economic development. Therefore, this paper puts forward the optimization method of modern history education resource allocation based on demand characteristics, which solves the problems existing in the traditional optimization method.

2 Optimization of Educational Resources Allocation of Modern History Based on Demand Characteristics

2.1 Analysis on the Demand Characteristics of Modern History Education Resources

In the optimization of educational resource allocation, the implementation of specific educational resource allocation optimization is often customized based on user needs.
However, users cannot fully understand the constraint dependencies in the entire model, and can only choose independent features through a variety of other requirements and other information [7]. What features the user decides to include or remove is not relevant. Maybe the feature that the user specifies to be excluded is exactly what an included feature depends on. Therefore, analyzing and modeling the relationship between user needs and feature models is the key to solving the optimization of educational resource allocation based on demand features.

Suppose the user decides that the feature of the final educational resource is $Q$, and the removable feature is temporarily empty. From the perspective of division, there are 16 feature combinations containing feature $Q$ ($2^4$); from the perspective of configuration rules, all effective educational resources containing feature $Q$ must include feature $A$, so adding feature $A$ can reduce the feature combination from 16 to 16.8. Among these eight feature combinations, there are only four valid feature combinations that satisfy the configuration rules, which are $(q_1, q_2, a_1, a_2)$, $(q_1, q_2, a_1)$, $(q_1, a_2, a_1)$, and $(q_1, a_1)$, respectively.

From the above analysis, it can be seen that the specific needs of users often meet about $2^n$ product variants ($n$ is the number of features not specified by users). Further analysis shows that the common part of all effective configuration sets (such as feature $Q$ and feature $A$) is the least dependent feature set including the user’s hard requirements; the features of non common parts can be bound according to the user’s actual needs or other constraints such as environment, such as feature $q_1$, $q_2$, $a_1$, $a_2$. Therefore, the minimum feature set including the user’s hard requirements is automatically calculated, and then its behavior is verified, which can lay the foundation for the subsequent dynamic binding based on the user’s requirements. Based on this, the common part feature set of the educational resource allocation set corresponding to the user’s needs is defined as the dependent feature set of the feature model slice.

Assuming that the user decides that the final product contains feature set $\{q, a\}$, according to the above analysis, we can get that the dependency feature set is $\{q_1, q_2, a_1, a_2\}$. In addition, according to the decomposition relationship of features, features $q_1$ and $a_1$ are decomposition patterns satisfying XOR group, that is, they are mutually exclusive. However, the dependency feature set $\{q_1, q_2, a_1, a_2\}$ only reflects the dependency between features, not the mutual exclusion between features $q_1$ and $a_1$. On the other hand, users can specify which features are excluded by the final educational resources.

To sum up, the optimization of educational resources allocation based on feature model is to realize the optimization of educational resources allocation in modern history through the combination and restriction of features. The user’s rigid demand reflects the three relationships of feature selection, abandonment and uncertainty. The dependent feature set only represents the public part of relevant educational resources, and the complete user needs need to be described by an exclusive feature set. Only the combination of dependent feature set and exclusive feature set can provide a more accurate analysis foundation for the subsequent realization of the abstraction of part of feature set in the whole behavior model. Therefore, the mapping result of user’s hard requirements to feature model is defined as slice result set, which consists of two parts of information: dependent feature set and exclusive feature set.
2.2 Construction of Educational Resource Allocation Model Based on Demand Characteristics

Based on the analysis of user needs in the previous section, a modern resource allocation model for educational history is constructed.

The defined feature model slice is a unary operation on the feature model $W$. The input of this operation is called the slicing criterion, that is, the user’s choice of features. The slicing criterion consists of the mandatory feature set and the removed feature set specified by the user. The output is called the slice result set, and it consists of a dependent feature set and a rejection feature set.

The following constraints exist on the educational resource allocation model:

$$\eta_{in} = \{ \cap x | x \in h_{sl} \}$$  \hspace{1cm} (1)

$$\eta_{excel} = \{ \cap \left( \frac{H}{y} \right) | y \in h_{sl} \}$$  \hspace{1cm} (2)

among them:

$$h_{sl} = \{ z | z \in W \land h_{sl} \subseteq z \}$$  \hspace{1cm} (3)

In the formula, $h_{sl}$ represents all the educational resources that meet the slicing criteria, $H$ represents a limited feature set in the allocation of educational resources, $\eta_{in}$ represents a dependent feature set, and $\eta_{excel}$ represents an exclusive feature set. $x$, $y$ and $z$ represent regular variables. The above constraints are the results derived from the semantic perspective of the feature model, and the slice result set $\prod_{sl}(W) = (\eta_{in}, \eta_{excel})$ is obtained. The result of feature slicing reflects the feature set which is most closely related to the specific needs of users. Based on this, we can further optimize the allocation of educational resources.

The calculation of the feature slice result set needs to meet the needs of the user and the overall constraint information of the feature model. An algorithm designed is the slice result set algorithm. The input of the algorithm is the user’s demand for features. Set $N_{in}$ and excluded feature set $N_{sl}$. The output is dependent feature set $P_{in}$ and excluded feature set $P_{sl}$.

First traverse each feature in $N_{in}$, the specific operation is as follows: if the feature does not belong to the feature dependency set $P_{in}$ and the feature exclusion set $P_{sl}$, then it is merged into the set $P_{in}$; at the same time, starting from the feature node in two directions The feature related nodes are searched. One direction is to its parent node until the root node is searched; the other is to its child node until the terminal node is searched. Any feature node in both directions will be included in the feature dependency set as long as it satisfies the dependency. In the same way, the algorithm traverses each feature in $N_{sl}$, and the traversal process is still performed in two directions. The difference is that the latter only searches its parent node when searching in the direction of its parent node, and only includes its parent node feature when the feature node satisfies the required attribute in the and group decomposition relationship; the search in the direction of its child node is the same as the feature dependency set until the terminal node is searched.
According to the above search process, various types of educational resource allocation have been passed in modern history, and traversal is a characteristic of demand. This is the basis for educational resource allocation and the combination of operating mechanisms to achieve the purpose of optimization.

2.3 Optimize the Operating Mechanism of Education Resource Allocation

The optimal allocation of modern history education resources is a dynamic process involving many factors such as objectives, environment, motivation and operation mechanism. These factors interact with each other and jointly affect the flow direction and final allocation effect of modern history education resources allocation [9]. From the perspective of system theory, this paper studies the mechanism of the optimal allocation of modern history education resources, analyzes the interdependence between the modern history education system and the environment, looks for the power source to promote the continuous optimal allocation of modern history education resources, and analyzes the operation mechanism and implementation path of the optimal allocation of modern history education resources [10].

The optimal allocation of educational resources plays an important role in the formation of the dissipative structure of the modern history education system and the realization of the balanced development of basic education. From the perspective of system science, that is, from closed to open, from chaos to order, from simple to complex. As a subsystem of the regional social system, the modern history education system has the basic characteristics of a general system, that is, it is composed of certain elements, has a certain structure and function, and exists independently of the surrounding environment. At the same time, it has an open character. Exchange material, energy and information with the environment. Specifically, the modern history education system refers to a network system composed of organizations, institutions, and implementation conditions related to the process of allocating resources for modern history education. It is composed of a number of regional governments and education departments, responsible for basic education information consultation and evaluation. It is composed of a supervision agency and several schools. The education system interacts with the surrounding environment. Under the promotion and pulling of various forces, various behavioral organizations in the system actively respond to changes in the environment, continuously formulate and adjust the development strategy of modern history education, and coordinate the relationship between basic education and regional environment, To promote the optimization of the allocation of educational resources in modern history.

On the basis of the above contents, different mechanisms are adopted to optimize the allocation of modern history education resources.

First, decision-making and consulting mechanisms. Decision-making is the premise and basis for scientific management of modern history education, and it is a key measure to ensure that local education is coordinated with regional economic and social development. Decision-making plays a central role in optimizing the allocation of educational resources in modern history. Effective decision-making can promote a reasonable and orderly flow between internal and external environmental elements, and ensure that human, financial, material and information resources of a certain size and quality are input into the modern history education system. Therefore, establishing a scientific and
efficient decision-making mechanism for the modern history education system is of great significance for optimizing the allocation of modern history education resources.

The rationality of organizational design is directly related to the scientificalness of decision-making. We must start with improving the organizational structure of decision-making, improve the education management system with strong overall planning and clear rights and responsibilities, and implement the hierarchical decision-making management of the central and local governments for basic education. In order to avoid the improper coordination and impassability of political orders caused by the differences of interests among governments at all levels, when designing the organizational structure and system of government decision-making, we must establish a clear and reasonable division of labor responsibility system to define their respective responsibilities, powers and interests, so as to make the behavior of the macro decision-makers coordinated. It is necessary to establish and perfect the micro decision-making body, make the school and the society’s strength fully play in the process of promoting the allocation of regional basic education resources, and provide a good system environment for all levels of education administrative departments and schools to make rational and independent decisions. Focusing on the transformation of government functions and the streamlining of administration and decentralization, we will improve the level of public education services, clarify the responsibilities of governments at all levels, unify the leadership and management of national education by the central government, formulate development plans, policies and basic standards, coordinate the management of basic education within the region by the provincial government, promote the balanced development of basic education, and implement the financial responsibility for the development of basic education in accordance with the law.

Consultation is an auxiliary process of decision-making. Governments at all levels must set up education advisory committees to provide consultation evidence for education reform and development, and to improve the scientific nature of major education decisions.

The second is the input and implementation mechanism. Education investment is a basic and strategic investment for the long-term development of the country, and an important function of public finance. We should improve the system of raising educational funds through various channels, with government investment as the main source. Governments at all levels should optimize the structure of financial expenditure and give priority to education as a key area of financial expenditure. In strict accordance with the provisions of education laws and regulations, ensure the “three growth” of education funds, and ensure the stable source and growth of school running funds. Compulsory education is fully included in the scope of financial security, and an investment system in which the State Council and the local people’s governments at all levels share the burden according to their duties and the provincial government is responsible for the overall implementation is implemented. The investment mechanism of government investment, social sponsor investment and family reasonable burden should be established in preschool education. Ordinary high school implements the mechanism of financial investment as the main and financing from other channels as the auxiliary. We will further increase investment in education in rural areas, remote and poverty-stricken areas and ethnic minority areas, and the central government will support the development of
education in underdeveloped rural areas and ethnic minority areas by increasing transfer payments.

Implementation is the process of implementing the plans and programs formed by decision-making. Whether it is the macro-decisions of governments at all levels or the micro-decisions of schools, education administration departments and schools must complete education activities. Therefore, the main body of implementation is the education administrative department and school. Only when the education administrative department and school earnestly complete and implement various decisions, and continuously innovate in the process of implementation, improve the efficiency of the allocation of educational resources, can promote the overall basic education system in the province Optimized allocation of resources.

The third is the supervision and feedback mechanism. Supervision is the basic guarantee of efficient implementation of various decisions and the control means of implementation. Different implementation projects have different decision-making plans and evaluation basis, which requires the government, society and schools to take necessary management methods to evaluate and supervise the process of each component of the implementation link, so as to ensure that education activities are carried out within a certain range of standards. Governments at all levels should conscientiously perform the responsibilities of overall planning, policy guidance, supervision and management, and the provision of public education services, establish and improve the public education service system, gradually realize the equalization of basic public education services, and maintain education fairness and order. Establish and improve the basic standards of national education, integrate the national education quality monitoring and evaluation institutions, improve the monitoring and evaluation system, and regularly issue monitoring and evaluation reports.

The coordination of the function of the education system and the output of the system is largely achieved through feedback, which is a controller for the optimal allocation of resources in provincial basic education and an important means for achieving sustainable development in modern history education. Adhere to financial management in accordance with the law, strictly implement the national financial fund management legal system, strengthen the supervision of the use of funds, strengthen the audit of the entire process of major project construction and use of funds, and ensure that the use of funds is standardized, safe and effective. Establish a performance evaluation system for the use of funds, strengthen the evaluation of the use of funds for major projects, establish and improve the management system for the allocation, use, and disposal of state-owned assets in schools, and improve the use efficiency. Through supervision and feedback, the goal of optimizing the allocation of educational resources in modern history is finally achieved.

The fourth is the policy incentive mechanism. Incentive mechanism, also known as incentive system, reflects the interaction between incentive subject and incentive object through a rational system. The connotation of incentive mechanism is the elements of several aspects of the system. Once the incentive mechanism is formed, it will play an internal role in the organization system itself, make the organization function in a certain state, and further affect the survival and development of the organization. We should take promoting the scientific development of education as an important part of
the performance appraisal of Party committees and governments at all levels, strengthen
the legal construction of basic education, further improve the institutional framework
of investment, management, use, audit and supervision of educational resources, gradu-
ally establish the system of announcement and examination of educational investment,
and fundamentally guarantee the standardization of the allocation of basic educational
resources. Do a good job of performance evaluation of basic education resource allo-
cation, strengthen fund management, establish education fund supervision and man-
agement institutions, improve education fund supervision functions, establish education
fund implementation analysis report system, establish fund performance evaluation sys-
tem, and strengthen major project fund use appraisal To ensure the effective use of
educational resources. Take the implementation of education investment and the use of
funds as an important basis for the performance evaluation of governments at all lev-
els and accept social supervision. Necessary rewards are given for meeting educational
standards and high use efficiency.

In summary, there is an organic relationship between the environment for the optimal
allocation of education resources in modern history and the input mechanism, supervi-
sion mechanism, and incentive mechanism. The interaction between them is shown in
Fig. 1, thereby realizing education in modern history. The purpose of resource allocation
optimization.

![Fig. 1. Operation mechanism of educational resource allocation optimization](image-url)
The educational resource allocation model optimized based on demand characteristics will be implemented under the above-mentioned operating mechanism to realize the optimization of educational resources allocation in modern history.

3 An Experimental Study on the Optimization Method of Educational Resources Allocation in Modern History

3.1 Experimental Platform Construction

A lot of teaching resources need to be used in the experimental research of the optimization method of modern history education resource allocation, so an experimental platform based on Hadoop is built. The building process of Hadoop distributed environment is to simulate linux environment through cygwin64 under Windows operating system. Install jdk64 and Tomcat server, and prepare to start building Hadoop platform. On the server side, set the user name as administrator, one master node and two slave nodes; the deployment work is carried out on the master branch, slave1 and slave as nodes obey the configuration. Modifying the hosts on the master is mainly to change the calculation and system path to /etc./hosts file, add the IP address of the master and slave nodes at the end of the hosts file, install and start the SSH service, and configure SSH password free login function, modify the configuration file of Hadoop, add the installation path of JDK in hadoop-env.xml file, and enter the start-all.sh command to start Hadoop. The experimental platform is completed.

3.2 Experimental Data Preparation

In the experimental study of the optimization of the allocation of educational resources in modern history, the experimental data of the ratio of teacher-student resources of ordinary primary schools, junior high schools, and ordinary high schools in a certain province is used as experimental data (Table 1).

| Number | Primary school | Primary school | High school | Total   |
|--------|----------------|----------------|-------------|---------|
| 1      | 14.2:1         | 16.3:1         | 15.2:1      | 15.23:1 |
| 2      | 14.6:1         | 16.7:1         | 15.6:1      | 15.63:1 |
| 3      | 14.7:1         | 15.8:1         | 17.2:1      | 15.90:1 |
| 4      | 14.9:1         | 16.3:1         | 18.5:1      | 16.56:1 |
| 5      | 14.3:1         | 16.1:1         | 16.9:1      | 15.76:1 |

Based on the data of teacher-student ratio of basic education resources in the table, this paper estimates the financial cost of the allocation of education resources, and then
optimizes it by using different optimization methods of the allocation of modern education resources, and analyzes the advantages and disadvantages of different optimization methods of the allocation of modern education resources according to the financial cost of the optimized allocation of education resources.

3.3 Experimental Results and Analysis

The results of financial cost required after using different optimization methods of education resource allocation are shown in the following figure.

Observing the results in the figure, Fig. 2 (a) shows the results of the 5 groups. There are two groups of results that have reduced costs after optimization, and the other three groups have increased costs after optimization. Compared with the previous one, the cost after optimization has decreased significantly, which shows that the optimization
method can effectively reduce the cost consumption. To sum up, the design method of resource allocation optimization based on the characteristics of modern history education consumes less cost, and this method is better than the traditional optimization method.

4 Concluding Remarks

The allocation of educational resources in modern history is closely related to the balanced development of education, which affects the sustainable development of the overall level of education and socio-economic development. It is of great significance to study the optimization of the allocation of educational resources for the development of education and economic levels. Designing a method for optimizing the allocation of educational resources in modern history based on the characteristics of demand, solving the problem of large consumption of financial resources in traditional optimization methods, rationally allocating teaching resources, and promoting the long-term development of the education industry, while ensuring that the social economy is developing in a good direction.

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