Scholar Publishing Group
International Journal of Educational Curriculum Management and Research
https://doi.org/10.38007/IJECMR.2024.050206
ISSN 2790-0967 Vol. 5, Issue 2: 41-52

Research on the Optimization Configuration and Sharing Mechanism of Educational Resources in the Information Age

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Keywords: Optimization Configuration, Educational Resources, Information Age, Sharing Mechanism

Abstract: In the era of informatization, optimizing the allocation and sharing of educational resources is of great significance in promoting educational equity and improving educational quality. This study is based on the background of the times, first sorting out the new characteristics endowed by the category, classification, and informatization of educational resources, analyzing the current situation of resource allocation, and revealing problems such as regional and hierarchical imbalances and insufficient coordination among subjects. Furthermore, a resource sharing mechanism covering shared entities, platform construction, and diverse modes will be constructed, and optimization configuration strategies based on big data, cloud computing, and blockchain will be proposed. At the same time, provide safeguard measures from the perspectives of policies, faculty, and supervision. The research results aim to help break down resource barriers, provide ideas for the development of educational informatization, and look forward to the application prospects of new technologies in the future.

1. Introduction

In today's society, the wave of informatization is sweeping across various fields around the world at an unprecedented speed, and the education industry is also deeply immersed in this torrent, undergoing profound and comprehensive changes. Despite the rapid development of information technology, it cannot be ignored that the problem of uneven distribution of educational resources still persists in China and even the global education system. From a regional perspective, the gap in educational resources between developed and underdeveloped regions is alarming. Taking the developed coastal areas in the east and remote inland areas in the west as examples, the eastern region is economically prosperous, technologically advanced, and has first-class education

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infrastructure. Schools in cities are generally equipped with intelligent multimedia classrooms, high-speed and stable campus networks, and experimental equipment that keeps up with cutting-edge scientific research achievements; On the other hand, in the western region, some rural schools have outdated and dilapidated teaching buildings, weak or even missing network signals, and scarce basic teaching equipment such as computers, let alone advanced digital laboratories. There is also a problem of resource imbalance between different levels of education. In the stage of basic education, high-quality educational resources are excessively concentrated in a few key primary and secondary schools, and the phenomenon of "school choice fever" and "school district housing" is a consequence of uneven resource distribution. These schools have abundant teaching resources, novel textbook versions, complete supporting materials, and diverse campus activities; Ordinary schools are plagued by insufficient teaching equipment and a shortage of teaching materials. At the higher education level, "Double First Class" universities have a large amount of research funding, top-notch research equipment, and high-quality academic resources. Ordinary universities face difficulties in talent introduction and research project application, and students have few opportunities for internship and academic exchange. In the current era of the surging wave of informatization, delving into the optimization and sharing mechanism of educational resources is not only an inevitable measure to adapt to the development of the times, but also a key choice to solve existing problems in education and move towards modernization of education. It carries the earnest expectations of countless educators and students, and is related to the long-term development of the national education cause and even the entire society.

2. Current situation and problems of educational resource allocation in the information age

2.1 Regional Differences in Educational Resource Allocation

In the current global wave of informatization, regional differences in the allocation of educational resources are like an insurmountable gap, spanning between developed and underdeveloped regions, seriously restricting the realization of educational equity. This difference is reflected in many key aspects such as infrastructure investment, faculty allocation, and digital resource ownership[1-3]. Developed regions, with their strong economic strength and policy preferences, have taken the lead in the construction of educational infrastructure. On campus, intelligent teaching buildings have sprung up, and multimedia classrooms are equipped with large high-definition displays, advanced electronic whiteboards, and high-speed and stable network equipment, creating an excellent teaching environment for teachers and students; Professional laboratories spare no expense in introducing international cutting-edge instruments to meet the diverse needs of students from basic experiments to scientific research and innovation. On the other hand, in underdeveloped areas, many school buildings are dilapidated, and problems such as mottled walls and leaking roofs are common; Multimedia classrooms are scarce, and the only equipment is outdated, with blurry projector images and noisy sound effects; The network bandwidth is tight, and there are frequent lags and disconnections during online teaching, which seriously affects the teaching progress and quality[4-5]. The dual structure of urban and rural areas has exacerbated the imbalance in regional education resource allocation. Taking rural schools as an example, insufficient network bandwidth has become the primary problem restricting the development of teaching. Many remote rural areas have weak network signals, 4G networks have not yet been popularized, let alone 5G network access[6], making online teaching activities difficult; High quality courses are scarce, and there is a lack of professional teachers to offer characteristic courses within the school. It is difficult to introduce high-quality courses both online and offline outside the school due to technical and copyright issues; The information literacy of teachers is generally low, and most teachers can only perform simple computer operations, making it difficult

to create courseware and unable to effectively utilize online resources for teaching.

2.2 Imbalance of resources at different educational levels

Educational resources are also deeply mired in imbalances at different levels, with both basic education and higher education facing difficult problems, seriously hindering the balanced and efficient development of the education industry. The shortage of resources in weak rural schools during the basic education stage is alarming. Lack of textbooks and teaching aids, outdated versions of textbooks in some schools, lack of accompanying exercise books and teaching aids, and boring teaching content, making it difficult to stimulate students' interest in learning; The experimental equipment is almost zero, and the physical, chemical, and biological experimental courses cannot be carried out normally. Students can only memorize experimental conclusions by rote, and their hands-on practical abilities cannot be cultivated; Extracurricular reading materials are scarce, and reading resources are limited to a few old books, making it difficult to broaden students' reading horizons. In sharp contrast, the problem of redundant resources in high-quality schools in cities is prominent. Teaching equipment is frequently updated and replaced, and brand new multimedia devices are eliminated before they are fully utilized; Various extracurricular tutoring materials are piled up like mountains, and students are exhausted from dealing with massive exercises; There is an excess of resources for campus club activities, with numerous art, sports, and technology clubs, but limited student participation and serious waste of resources. Entering the stage of higher education, the polarization of resources has become increasingly prominent. Key universities can be called "giants" in scientific research, holding strong research resources. The state and local governments continue to invest huge amounts of scientific research funds, and major scientific research projects worth tens of millions or even billions of yuan are not uncommon. Ordinary universities are in a difficult situation, with severe funding shortages and difficulties in maintaining daily teaching operations. They are also unable to purchase advanced scientific research equipment and carry out large-scale scientific research projects; The equipment is outdated and aging, the accuracy of experimental instruments has decreased, malfunctions occur frequently, and maintenance funds are scarce; The research ability of the teaching staff is limited, and there is a lack of research start-up funds and project support, making it difficult to produce high-level research results; The serious loss of high-quality students, the significant gap between admission scores and key universities, and the uneven overall quality of students limit the overall development of the school.

2.3 Insufficient coordination among resource allocation entities

The allocation of educational resources involves multiple stakeholders. Ideally, the government, schools, and enterprises should each fulfill their respective responsibilities and collaborate to form a strong synergy. However, in reality, the unclear positioning of the roles of the three parties and the lack of coordination mechanisms have led to chaotic resource allocation and low efficiency.

As the leader of macroeconomic regulation of educational resources, the government shoulders the responsibility of planning, investment, and supervision. However, some policy plans have been implemented slowly and lack effective execution and supervision mechanisms. For example, the policy of rotating teachers between urban and rural areas aims to narrow the gap between urban and rural teachers, but in some areas, it has become a mere piece of paper due to ineffective implementation by local governments and incomplete supporting measures; After the allocation of special education funds, there is a lack of supervision, unclear flow of funds, and occasional misappropriation, resulting in a failure to accurately invest in areas where educational resources are lacking. As direct users and managers of educational resources, schools should actively promote

resource sharing and improve resource utilization efficiency. However, the reality is that most schools have low enthusiasm for resource sharing and are constrained by traditional "individualism" thinking, fearing that the outflow of high-quality resources will affect their competitiveness; The management of resources on campus is chaotic, lacking scientific classification, integration, and sharing mechanisms. The phenomenon of idle teaching equipment and waste of teaching materials is not uncommon; There are numerous obstacles to cross school resource allocation and cooperation, and there is a lack of effective organization of inter school relationships. Issues such as benefit distribution and intellectual property ownership remain unresolved, and resource sharing agreements are difficult to reach. As important providers of technology and funding, enterprises have limited depth in participating in the allocation of educational resources. On the one hand, the cooperation model between enterprises and schools is single, limited to simple sponsorship and joint construction of internship bases, lacking long-term strategic partnerships; The advanced technology of enterprises is difficult to effectively integrate into the teaching process, and product development is disconnected from educational needs, failing to fully leverage technological advantages to help digitize and intelligentize educational resources; On the other hand, there is a lack of incentive mechanisms for enterprises to participate in the construction of educational resources, and policies such as tax incentives and project subsidies are not fully implemented, which reduces the enthusiasm of enterprises to engage in the education industry. There is a lack of unified coordination mechanism for cross regional and inter school resource allocation. There are significant economic and cultural differences among different regions, making it difficult to unify resource allocation standards and balance interests and demands; The lack of an authoritative third-party coordination platform for cross school resource sharing, information asymmetry, and difficulty in accurately connecting resource supply and demand, as well as the difficulty in promoting cooperative projects, hinder the optimization and sharing of educational resources on a larger scale. In the era of informatization, there are many problems in the allocation of educational resources in terms of regional, hierarchical, and inter subject coordination. It is urgent to establish a scientific and reasonable optimization and sharing mechanism, break the existing deadlock, achieve balanced and efficient utilization of educational resources, and promote educational equity and quality improvement.

3. Construction elements and models of educational resource sharing mechanism

3.1 Shared subjects and objects

The smooth operation of the mechanism for sharing educational resources relies on clearly defined participants and service recipients. Each entity plays a key role in the resource sharing ecosystem by leveraging their unique advantages and working together to make progress; By clearly defining the scope of the target audience, we can accurately align with the needs and maximize the value of shared resources. The education administrative department, as the leading force in policy formulation and resource allocation, shoulders the responsibility of overall planning. It guides the flow of educational resources to weak areas and key disciplines through the introduction of regulations and policies, and establishes a framework of rules for the sharing mechanism; Using financial appropriations, project approvals, and other means to incentivize schools and enterprises to engage in the cause of resource sharing; Also responsible for supervisory functions, ensuring compliance in the sharing process, fair allocation of resources, and timely correction of violations. All levels and types of schools are the core gathering and output ends of educational resources. Universities provide theoretical nourishment for basic education with their strong research capabilities and cutting-edge academic resources; Provide feedback on teaching practice difficulties in primary and secondary schools, and assist universities in optimizing

educational theory research. Different levels and regions of schools complement each other's resources, high-quality urban schools output advanced teaching methods and high-quality courses, and weak rural schools share local educational materials and folk cultural knowledge, working together to narrow the education gap.

Education technology enterprises holding cutting-edge technology and financial advantages are the "catalysts" for resource sharing. Enterprises can integrate cloud computing, artificial intelligence, virtual reality and other technologies into teaching products, develop intelligent teaching software and immersive learning devices; Participate in the construction of school information infrastructure, improve network environment, and upgrade hardware facilities; We can also collaborate with schools to develop talent, customize courses that meet market demand, provide internship opportunities, and connect education and employment channels. Social organizations include public welfare foundations, education associations, academic groups, etc., playing a flexible and complementary role in resource sharing. The public welfare foundation raises funds to provide targeted assistance to schools in impoverished areas to purchase teaching equipment and support impoverished students; The Education Association builds a communication platform, organizes academic seminars and teaching observation activities, and promotes the professional growth of teachers; Academic groups focus on the forefront of disciplines, organize expert lectures and project collaborations, and enhance the academic research level of the school. The shared objects include teaching staff, students, parents, and social learners. Teaching staff use this opportunity to broaden their teaching horizons, obtain innovative teaching cases and advanced teaching concepts, and exchange teaching skills with peers; Students can select suitable resources according to their needs, break through the limitations of textbooks, personalize learning paths, and meet diverse learning needs; Parents can have a deep understanding of education policies and teaching trends, obtain guidance resources for family education, and cooperate with schools to carry out family education; Social learners use their spare time to enrich themselves, enhance their vocational skills and cultural literacy, and keep up with the pace of knowledge in the times.

3.2 Building a Sharing Platform

3.2.1 Technical Architecture

Building a stable and efficient platform for sharing educational resources relies on advanced technological architecture support. Cloud computing technology can be regarded as a cornerstone, relying on the advantages of distributed storage and elastic computing to solve the problem of storing massive educational resources. Schools and enterprises upload resources to the cloud, which are managed by cloud service providers to allocate storage and computing resources as needed, reducing hardware procurement and maintenance costs; Users, whether in remote mountainous areas or bustling cities, can quickly access resources as long as they connect to the network, without fear of geographical or device limitations, achieving "on-demand use" of resources.

Blockchain technology builds a solid defense line for platform security and rights protection. The decentralized nature of blockchain eliminates the risk of data tampering. Resource uploads and transaction records are encrypted throughout the entire process, and cannot be forged or deleted, ensuring the originality and copyright ownership of resources; The smart contract function automatically executes resource sharing agreements, allocates profits and settlement fees according to preset rules, and improves transaction transparency and efficiency; User identity information is authenticated by blockchain, strengthening privacy protection and creating a secure and trustworthy sharing environment.

3.2.2 Functional Module Design

The resource upload module facilitates users to share high-quality resources. Teachers upload self-made high-quality courseware, teaching videos, and teaching designs; The school releases its school-based curriculum and teaching achievements; Enterprises launch trial versions of educational products and technical training materials; Social organizations publicize information on public welfare projects and academic activities. Set detailed tags and classification information when uploading for accurate retrieval.

The download function meets the local learning needs of users, supports multiple formats for downloading, and adapts to different devices; The retrieval module is equipped with an intelligent search engine. Users can quickly locate the required resources by entering keywords, and can also filter based on multiple dimensions such as subject, grade, and resource type; The evaluation function allows users to mutually evaluate, score, and leave comments to reflect the quality of resources, providing reference for future users and motivating creators to optimize resources.

Creating an online learning community through user communication and interaction modules. Teachers and students can share their learning experiences and teaching questions, and invite peers to answer and clarify their doubts; Set up a topic discussion area to focus on educational hotspots and subject difficulties, and collide ideas and sparks; The teaching activity organization module supports online live teaching, virtual classrooms, and group collaborative learning, breaking the limitations of time and space and expanding teaching scenarios.

3.3 Classification and Cases of Sharing Modes

3.3.1 Campus Sharing Mode

Taking the teaching resource management system of a certain university as an example, the mechanism of mutual selection of courses within the university has achieved remarkable results. Universities integrate high-quality courses from various colleges and majors, break down professional barriers, and allow students to choose desired courses across disciplines. Literature majors can take computer programming courses as electives to broaden their employment skills; Science and engineering students are involved in humanities and arts courses to enhance their cultural literacy. The mechanism of sharing experimental equipment revitalizes campus resources, centralizes the management of large instruments and equipment, and opens up appointments for use throughout the school to avoid duplicate purchases and idle waste; Record the entire usage of the equipment for easy maintenance and statistical analysis.

3.3.2 Inter school sharing mode

The resource sharing agreement of regional university alliances is a model of inter school cooperation. Member universities exchange teachers to give lectures, backbone teachers bring advanced teaching methods, and young teachers learn from different places; Shared laboratories provide a platform for scientific research cooperation, where research teams from different universities jointly apply for projects, complement each other's strengths, share experimental equipment and technical talents, and accelerate the output of scientific research results; Jointly carry out talent training programs, recognize credits, encourage students to take courses across schools, participate in practical activities, broaden their horizons, and enrich their learning experiences.

4. Strategies for optimizing the allocation of educational resources based on information technology

4.1 Utilizing big data to achieve precise configuration

In the information age, big data is like a "digital gold mine" with endless value, providing unprecedented opportunities and powerful assistance for the precise allocation of educational resources. The first step in achieving precise configuration is to collect comprehensive and multi-dimensional data, integrate multiple sources of information such as student learning data, teacher teaching data, and school resource data, and build a large and detailed education database.

Student learning data covers rich details such as academic performance, daily homework completion, classroom participation, online learning duration, types and frequency of mistakes. With the help of intelligent learning systems and online education platforms, it is possible to accurately track and record every learning behavior of students. For example, a certain online learning app records in detail the number of pauses and replays of students watching course videos, the time spent answering questions, and the trajectory of their thinking. Through these data, it can deeply insight into students' weak areas of knowledge mastery and learning habits preferences. Teacher teaching data includes information on the application of teaching methods, teaching schedule arrangement, courseware production quality, and student evaluation results, reflecting the teacher's teaching style and effectiveness, and facilitating the discovery of optimization points in the teaching process. The school resource data includes the frequency of use and wear and tear of teaching equipment, the inventory quantity and circulation frequency of textbooks, and the idle period of classrooms, visually presenting the status of idle and scarce resources.

After completing data collection, utilizing advanced data mining algorithms for in-depth analysis and scientific decision-making is the core link in empowering precise allocation of educational resources with big data. Data mining algorithms use techniques such as clustering analysis, association rule mining, and decision trees to organize massive and disordered data into clear and valuable information, providing precise insights into teaching needs. In terms of textbook placement, by analyzing student learning data and subject exam outlines, the actual situation of different grades and students' mastery of textbook knowledge points is clarified. If it is found that students in a certain region have a high error rate in the mathematical function section, more high-quality textbooks related to function topics and exercises can be allocated accordingly; For remote rural schools, given the weak foundation of local students and the scarcity of extracurricular resources, priority should be given to delivering textbooks that solidify basic knowledge and interesting science popularization materials.

Big data also plays a significant role in the precise deployment of teaching equipment. Analyzing the correlation between equipment usage frequency and teaching needs in school resource data, it was found that a certain high school has frequent physical, chemical, and student laboratory courses, but the laboratory equipment is outdated and frequently malfunctioning, which seriously affects teaching effectiveness. Therefore, professional equipment such as microscopes and chemical laboratory equipment can be promptly deployed; In response to the emerging demand for artificial intelligence course teaching, combined with the allocation of teachers and student interest in schools within the region, cutting-edge teaching equipment such as intelligent robots and programming kits will be deployed to schools with conditions to meet actual teaching needs and avoid blind procurement and resource waste.

4.2 Utilizing cloud computing to improve resource storage and distribution efficiency

The booming development of cloud computing technology has opened up a new path for the

storage and distribution of educational resources, reshaping the management pattern of educational resources with many significant advantages. The advantage of cloud storage is paramount, and the problem of storing massive educational resources is easily solved. The traditional local storage method requires schools to purchase a large number of servers and hard disk arrays, which not only incurs high hardware costs in the early stages, but also incurs high expenses for equipment maintenance, upgrades, and power consumption in the later stages; And limited by physical storage space, expanding storage capacity is cumbersome. Cloud computing is completely different. Educational institutions upload resources to the cloud, such as education exclusive cloud platforms built by professional cloud service providers such as Alibaba Cloud and Tencent Cloud, and rent storage resources on demand to achieve significant cost reductions. Taking a university with tens of thousands of students as an example, if it builds its own data center to store teaching videos, academic papers, electronic textbooks and other resources, the initial construction cost can easily reach tens of millions of yuan. However, adopting cloud computing services only requires a rental fee of hundreds of thousands of yuan per year, greatly reducing the financial burden.

The high reliability of cloud storage is beyond the reach of traditional storage. The cloud data center is equipped with advanced redundant backup mechanisms and disaster recovery solutions, using distributed storage technology to store data in multiple geographically dispersed data nodes. Even if a node encounters hardware failures, natural disasters, or other extreme situations, the data remains intact and undamaged, ensuring the security and stability of educational resources. For example, a sudden earthquake occurred in a certain area, causing severe damage to the local school server, but the teaching resources stored in the cloud remained intact, allowing teaching activities to be quickly restored and carried out with the help of cloud resources.

At the level of resource distribution, the cloud distribution mechanism of cloud computing is unique, optimizing resource distribution paths based on geographical and network conditions to ensure rapid access to resources. Cloud service providers deploy edge nodes around the world through Content Delivery Network (CDN) technology, intelligently selecting the closest and most optimal node to push resources based on the user's geographical location. When students in the western region request to download large teaching courseware, the system automatically transmits data from nearby CDN nodes to avoid long-distance data travel and reduce network latency and packet loss; In response to network congestion areas, cloud computing platforms dynamically adjust distribution strategies, reduce resource transmission rates, adopt caching technology, prioritize the smooth download of key teaching resources, and enable teachers and students to obtain the required resources in a timely manner, thereby improving the timeliness and coherence of teaching activities.

4.3 Utilizing blockchain technology to safeguard resource rights and security

Blockchain technology, with its decentralized and tamper proof encryption features, has strongly entered the field of educational resources, safeguarding resource rights and security, and reshaping the trust foundation of the resource sharing ecosystem. Equity recognition is one of the key applications of blockchain to empower educational resources. In the process of creating and sharing traditional educational resources, the definition of creator rights is vague, and works are prone to infringement and piracy, which seriously undermines creative enthusiasm. Blockchain encryption technology customizes digital identities for resource creators and owners. When a work is uploaded to the blockchain platform, key data such as creator information, creation time, and copyright ownership are encrypted using hash algorithms to generate a unique digital fingerprint, which is permanently stored in the blockchain distributed ledger and cannot be forged or tampered with.

For example, a teacher's carefully crafted teaching courseware is uploaded to a blockchain based educational resource platform, and the metadata attached to the courseware is recorded by the

blockchain, making the teacher the sole copyright owner; Afterwards, no matter how the courseware is disseminated and used online, it can be traced back to its source, and teachers are entitled to copyright benefits in accordance with the law. This mechanism of clear ownership of rights and interests greatly stimulates the creative enthusiasm of teachers and educational institutions, continuously producing high-quality educational resources and enriching the resource sharing "ammunition depot".

At the level of security protection, blockchain technology is as solid as a rock, resisting data tampering, infringement and piracy, and maintaining the health of the resource sharing ecosystem. The decentralized architecture of blockchain abandons the traditional single center server storage model, and data is stored in numerous nodes, making it difficult for hackers to concentrate on attacking and tampering with data; Every data transaction and resource usage record needs to be verified by all network nodes, and tampering with data requires tampering with over 50% of node information, which is almost impossible to achieve. When someone attempts to illegally copy and distribute teaching resources protected by blockchain, the system automatically triggers smart contracts, restricts resource access, issues infringement alerts, and holds infringers legally responsible; At the same time, blockchain, digital watermarking, encrypted transmission and other technologies work together to comprehensively protect the security of resources during storage, transmission and use, creating a clean, legal and orderly environment for educational resource sharing.

In summary, information technologies such as big data, cloud computing, and blockchain have each demonstrated their strengths. From precise configuration and efficient storage and distribution to safeguarding rights and security, they have comprehensively and multi-dimensional optimized the allocation of educational resources, promoting the steady progress of the education industry in the wave of information technology and embarking on a new journey of fairness, efficiency, and innovation.

5. Guarantee measures for optimizing the allocation and sharing of educational resources

5.1 Policy and regulatory safeguards

As the top-level design and institutional cornerstone for optimizing the allocation and sharing of educational resources, policies and regulations play an irreplaceable key role in regulating resource flow and balancing the rights and interests of all parties. At present, China's education industry is developing rapidly, and the demand for resource sharing is becoming increasingly urgent. It is urgent to improve the policy and regulatory system.

At the legislative level, the formulation of special regulations on the sharing of educational resources has become an urgent task. Although current laws and regulations to some extent involve matters related to educational resources, they lack specificity and are difficult to fully cover the complex issues that arise during the sharing process. The special regulations on sharing educational resources should clarify the boundaries and norms of resource use, and carefully define the usage rights, scope, and methods of different types of educational resources. For example, regarding digital teaching courseware, regulations should stipulate under what authorization conditions it can be disseminated and shared within and between schools, and prohibit unauthorized commercial use; For physical resources such as experimental equipment and teaching venues, clarify the usage process, appointment mechanism, and punishment measures for illegal use.

It is particularly important that regulations strengthen the protection of intellectual property rights. In the current booming development of educational resource sharing, infringement and piracy phenomena occur from time to time, greatly dampening the enthusiasm of creators. Regulations should clarify the copyright ownership of educational resources. Once a creator

completes a work, they automatically enjoy the corresponding copyright, and others must follow principles such as reasonable payment and attribution when using them; Establish a rapid rights protection mechanism, where creators can file complaints through convenient online and offline channels when they discover infringement, and law enforcement departments can quickly intervene in investigation and handling, shorten the rights protection cycle, increase the cost of infringement, and create a good atmosphere of respecting knowledge and protecting copyright.

At the policy guidance level, the government can fully leverage its economic control capabilities, introduce a series of tax incentives and project subsidy policies, and widely stimulate the enthusiasm of enterprises to participate in the construction and sharing of educational resources. The tax preferential policies aim to reduce the tax burden of participating enterprises, and provide a certain period of tax relief to enterprises engaged in the research and development, production, and sharing of educational resources. For example, if a company develops educational software or online learning platforms, the R&D funds invested can be deducted before the company's income tax; Enterprises that provide free technical services and equipment donations to educational institutions are entitled to corresponding tax exemptions, which incentivize them to increase investment in the education sector.

The project subsidy policy provides direct financial support for enterprises to participate in resource construction. The government sets up a special education resource construction subsidy project, and after enterprises apply for approval, they will receive funding subsidies based on project progress and achievement quality. If a certain technology enterprise is committed to developing virtual reality (VR) teaching resources, the government will provide phased funding support after evaluating the feasibility and innovation of the project, helping the enterprise overcome technical difficulties, expand production scale, promote VR teaching resources to enter campuses, and enrich teaching methods.

5.2 Construction of Teaching Staff

As direct users and disseminators of educational resources, the information literacy and sharing awareness of the teaching staff are directly related to the effectiveness of resource optimization and allocation. Strengthening the construction of the teaching staff is a key measure to bridge the "last mile" of educational resource sharing.

Information technology training is indispensable. Education departments and schools should regularly organize teachers to participate in information technology application training, keep up with the technological trends of the times, and enhance their ability to integrate and apply resources. The training content should be rich, diverse, and designed in a layered manner, targeting teachers with weak foundations. It should include teaching computer basic operations and commonly used office software to help them proficiently create teaching courseware and manage teaching documents; For teachers with a certain foundation, advanced training will be provided on the use of online teaching platforms and the design of online courses, enabling them to flexibly carry out online teaching; For backbone teachers, cutting-edge technologies such as big data analysis and artificial intelligence assisted teaching are introduced for training, empowering precise teaching decisions and creating personalized teaching plans.

The training format should also be flexible and diverse, combining online and offline methods. Online training courses are offered through MOOC platforms and educational live streaming websites, allowing teachers to learn independently and watch repeatedly in fragmented time; Invite experts offline to give lectures, organize practical exercises for teachers, answer questions and clarify doubts on site, and strengthen the training effect. After the training is completed, a strict assessment mechanism will be established to link the assessment results with the evaluation of

teacher professional titles and excellence, and to urge teachers to effectively master information technology skills.

The incentive mechanism is equally crucial, and a comprehensive reward system should be established to recognize outstanding teachers who actively participate in resource sharing. At the level of spiritual rewards, regularly select honorary titles such as "Star of Resource Sharing" and "Pioneer of Education Informatization", widely promote advanced deeds within the education system, and enhance teachers' sense of professional honor; In terms of material rewards, award winners with bonuses and subsidies for purchasing teaching equipment, prioritize opportunities for external training and academic exchanges, so that teachers can truly feel the benefits and rewards brought by shared resources, stimulate internal motivation, and actively engage in resource sharing practices.

5.3 Supervision and Evaluation Mechanism

The supervision and evaluation mechanism is like a "quality inspector" and "navigator" for optimizing the allocation and sharing of educational resources, real-time controlling the flow of resources, accurately adjusting resource allocation and sharing strategies, and ensuring that resources are maximized.

Establishing a sound resource allocation supervision system is the primary task. The education regulatory department shall establish a professional supervision team to regularly conduct on-site inspections of the allocation of resources in schools and educational institutions. Regarding the procurement of teaching equipment, verify whether the equipment model and quantity are consistent with the contract, whether the equipment installation and commissioning are timely, and whether the usage condition is good; For textbook delivery, check whether the textbook version is compatible with the teaching syllabus, whether there are quality issues such as missing pages and wrong printing, and whether the delivery is timely and sufficient; Pay close attention to teacher allocation, supervise the implementation of teacher rotation and exchange policies, and ensure that key teachers go to weak schools to support teaching on time.

Strictly investigate and punish behaviors of idle and wasteful resources. By utilizing information technology, a resource management and monitoring platform is established to monitor the real-time usage of teaching equipment, laboratories, classrooms, and other resources, and to provide timely warnings for resources with high idle rates; Once resource waste is discovered, such as a large backlog of textbooks, long-term idle and damaged equipment without maintenance, relevant responsible persons will be held accountable, rectification will be urged, and idle resources will be activated.

Improving the evaluation index system for sharing effectiveness is equally crucial, which comprehensively evaluates from multiple dimensions such as user satisfaction, resource utilization, and teaching effectiveness. The user satisfaction survey is aimed at teachers, students, parents, and social learners to understand their evaluations of shared resource content, accessibility, and platform interaction experience, and to collect opinions and suggestions; Calculate the frequency of resource downloads and usage, analyze the popularity and applicability of resources, and accurately locate idle resources based on resource utilization rate; The evaluation of teaching effectiveness focuses on the improvement of students' academic performance and the development of their abilities and qualities, comparing the changes in teaching effectiveness before and after resource sharing.

Adjust configuration and sharing strategies based on feedback from evaluation results. If students in a certain region have low satisfaction with online courses and low resource utilization, analyze the reasons and adjust the course content and teaching methods; If the teacher rotation exchange fails to achieve the expected teaching results, improve the rotation mechanism, provide

supporting training, continuously iterate and optimize, ensure that educational resources always meet teaching needs, and achieve efficient allocation and sharing.

In summary, the three guarantee measures of policies and regulations, teaching staff, and supervision and evaluation support each other and work together to build a solid defense line for optimizing the allocation and sharing of educational resources, and promote China's education industry to move towards a new journey of fairness, efficiency, and quality.

6. Conclusion

This study closely follows the pulse of the information age and conducts in-depth exploration around the optimization allocation and sharing mechanism of educational resources, yielding fruitful results. In terms of resource optimization and allocation principles, three key principles have been established: balance, adaptability, and dynamism. Balance aims to eliminate resource gaps between regions, urban and rural areas, and schools, and ensure fairness in the starting point of education; Adaptability requires resources to accurately match teaching objectives and student characteristics, meeting diverse teaching demands; The dynamism promotes flexible adjustment of resource layout with the development of education and technological innovation. In terms of building a sharing mechanism, it is clear that education administrative departments, schools, enterprises, and social organizations are the core sharing subjects, and teachers, students, parents, and social learners are the main service objects; Build a fully functional sharing platform with the help of cloud computing, blockchain and other technologies, covering various modules such as resource upload and download, communication and interaction; We have also identified diverse sharing models such as intra school mutual selection, inter school alliances, and social openness to enhance the efficiency of resource circulation. The configuration strategy has achieved significant results, with big data achieving precise configuration, insight into teaching needs, and targeted resource allocation; Cloud computing reduces storage and distribution costs, accelerates resource flow; Blockchain ensures the security of rights and interests, and stabilizes the sharing ecosystem. At the level of safeguard measures, policies and regulations provide institutional support, teacher training and incentives activate teacher motivation, supervision and evaluation mechanisms correct errors in real time, and comprehensively safeguard resource optimization and sharing.

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