

# Application of Information Technology in Optimizing the Governance of Basic Education Groups

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**Abstract**—Running schools by forming basic education groups is an important measure for the reform and innovation of education system in China. A basic education group is a collection of schools, and its internal governance is very important for the smooth operation and performance improvement of the group. Nowadays, the highly developed information technology has provided a powerful tool for optimizing the governance of basic education groups, however, the relevant research on the application of information technology in optimizing the governance of basic education groups is very insufficient. For this reason, this paper sorted out the problems existing in the governance of basic education groups; then, from the perspective of industrial organization, the paper analyzed the mechanisms to optimize the governance of basic education groups, and proposed a few ideas for applying information technology to optimize the governance of basic education groups.

**Keywords**—information technology, basic education, education group, governance

## 1 Introduction

In recent years, in order to achieve education fairness and improve education quality, the new schooling method, basic education groups have sprung up everywhere, becoming an important measure for the reform and innovation of China's basic education system. A basic education group is a collection of multiple schools, its internal governance relationships, including the responsibilities, rights and interests of each party engaging in the group, and the decision-making rules and procedures, are very important for the smooth operation and performance improvement of the group. Applying information technology and building information highways have a positive role in solving the information asymmetry problem within the group, and in improving communication efficiency, optimizing supervision methods, and promoting performance management. Without good information communication, high-efficient group governance could not be achieved. In today's information era, big data, cloud computing, Internet of Things, blockchain and other information technologies have provided powerful tools for optimizing the governance system of basic education groups. Currently, there are many studies concerning the application of information

technology in the governance of enterprise groups and higher education field, but there're few studies taking basic education groups as the research objects. Therefore, there's an urgent need to clarify the relationship between information technology and the governance of basic education groups, so that people could better employ the information technology to improve the governance efficiency of basic education groups.

Existing studies have shown that information technology is closely related to corporate governance [1], and IT governance has become a part of corporate governance [2]. As the role of information technology in investment costs and risk control is becoming increasingly important [3], it's necessary to discuss the relationship between information technology and corporate governance. Some research pointed out that the use of information technology can improve the efficiency of the business processes of enterprises and it might be able to improve the performance of the organization [4, 5]. The McKinsey & Company also pointed out that, for enterprises, information technology has been embedded in their business structure, and it is critical to their performance in market competitions [6]. In the governance structure of enterprises, the board members' understanding and mastery of IT knowledge and skills is very important for the management of the enterprises [7]. Al-Sartawi et al. studied the relationship between information technology and the corporate governance performance of listed companies and found out that there's a significant positive correlation between the two [8]. Juhandi et al. pointed out in their research that, information technology can generate new innovations and creativity; due to the incomplete corporate governance of enterprises in Indonesia and other developing countries, the management level of these enterprises could not reach the optimal status, and the solution is to exert the role of information technology to the greatest extent [9]. The research of Sirisomboonsuk et al. on the relationship between information technology, project governance and performance showed that, information technology has a positive impact on project governance and performance [10]. Information technology such as big data is a key resource that can contribute to corporate revenue growth by enhancing the company's ability in sales, R&D, operation, and management [11]. Moreover, information technology also has a significant positive impact on the performance of employee management of the enterprises [12].

Some existing studies researched the impact of information technology on the governance structure and performance of industrial organizations, such as the public health sector [13], urban management [14], and other platform organizations like eBay and Airbnb [15, 16]. Wu et al. integrated strategic alliances and IT governance models and proposed a jurisprudence model for creating organizational value through IT governance mechanisms; and they concluded that the impact of IT governance mechanisms on organizational performance can be achieved via strategic alliances [17]. Rodriguez et al. summarized the status quo of information technology in the field of higher education governance in various countries and found that the effects are quite different [18].

Above-mentioned literatures are mostly studies concerning the impact of information technology on corporate governance structure and performance. Although some had taken organizations in the education field as the research objects, these

objects are generally the higher education, in terms of the governance of basic education groups, very few studies had paid attention to this aspect. To fill this research blank, this paper summarized problems existing in the governance of basic education groups, then, from the perspective of industrial organization, the paper analyzed the mechanisms of optimizing the governance of basic education groups through information technology, and proposed ideas for applying information technology to optimize the governance of basic education groups.

## **2 Current status and problems of basic education group governance**

### **2.1 An overview of the development of basic education groups**

Since the 1990s, the schooling method of forming vocational education groups started in China, and then the schooling method had been transformed and applied to the field of basic education. Since 2000, basic education groups began to emerge in Hangzhou, Beijing, Chengdu, and other places, and some have formed certain scales. With famous schools, advantageous schools, and special schools as centers, multiple schools clustered to form groups and developed together, promoting the regional education to develop evenly and steadily.

In 2012, the State Council of China issued the Opinions on Further Promoting the Balanced Development of Compulsory Education, which specifically pointed out that we should give full play to the leading role of advantageous schools and explore the schooling method of forming education groups. This is the first time the country proposed to explore the grouped schooling method at the national level. In December 2018, the State Council issued the Implementation Plan for Accelerating the Advancement of Education Modernization (2018-2022), which further clarified to promote the sharing of high-quality educational resources through multiple methods such as school alliances and education groups. Obviously, education groups have already become a key and hot spot for the development of basic education of China.

### **2.2 The connotation of basic education group governance**

The concept of governance originated from corporate governance. The Organization for Economic Co-operation and Development (OECD) summarized the research results of different scholars on corporate governance in 1999, and pointed out that corporate governance is a set of management and control systems for enterprises, corporate governance clearly stipulates the responsibilities and rights of each interest parties, such as shareholders, board of directors, and executives, and it clearly states the rules and procedures that should be followed when making decisions of corporate affairs [19].

In terms of the schooling practice of basic education groups, governance is a set of system that clearly stipulates the responsibilities, rights, and benefits of all parties in the school cluster, including the "hardware level" organizations such as the decision-

making committee, the administrative committee, the school principal, and member schools, and the "software level" definitions such as the division of rights and responsibilities of each party and the supporting operating mechanisms, etc.; the core of governance is to rationally manage the relationships of the rights, responsibilities, and interests of the relevant parties within the education groups, so that the education groups can operate scientifically, democratically, and efficiently.

### **2.3 Basic modes of basic education group governance**

According to the closeness of the relationship between group members, the basic education groups can be divided into three types: close type, semi-close type, and loose type. Education groups of different types have different governance structures. There are a few governance modes of basic education groups, including the system in which the general principal assumes the responsibility, the system in which each member school assumes the responsibility under the guidance of the administrative committee, and the system in which each member school assumes the responsibility under the cooperative agreement model.

The governance modes of education groups are closely related to the formation forms of the group. In the school practice of basic education groups in China, there are a few formation forms:

First, one school with multiple campuses (also called school districts). That is, a same school is replicated repeatedly to form multiple campuses; a general principal oversees multiple campuses; teachers flow between different campuses, the teaching progress of different campuses is synchronized, each campus exerts its unique advantages, and they create and share the resources and outcomes together [20]. For example, the Hangzhou West Lake Elementary School Education Group was established based on the Hangzhou West Lake Elementary School, now the education group runs multiple campuses, and a general principal is responsible for the overall management, the member campuses interact with each other and develop together.

Second, forming education group with a famous school as the center. That is, with a famous school as the core, combining with less advantageous schools, new schools, and rural schools to form education groups, then, the teaching resource of the core school could be spread, and thus forming an educational balance. Although the core school has no decision-making power over the other member schools, the mature management mode of the core school can act as a good example for them. Education groups formed in this way generally adopt the system in which each member school assumes their respective responsibility under the guidance of an administrative committee, one example is the Nanmen Elementary School Education Group in Hefei, Anhui Province, the group has a schooling-affairs committee (the decision-making organization) and an executive council (the executive organization), the general principal does not manage the schools directly, but manages the leaders of each member school; all member schools have their own management autonomy and are independent bodies, they interact with each other, and respect each other's features [21].

Third, agreement alliance. That is, under the coordination of administrative education sectors, the less advantageous schools in the region form alliance with advanta-

geous schools, the two parties do not interfere in the administrative management of each other, and their ownership rights remain unchanged, however, through teacher exchanges, education training, and other methods, the less advantageous schools could enjoy the high-quality resources of the advantageous schools, which can promote the rational allocation of educational resources. For example, the Beijing Second Experimental Primary School Education Group has recruited member schools in many suburbs during the promotion of the "Urban-Rural Integration" project in Beijing, which has effectively promoted the development of the member schools.

Some large-scale education groups have the above three governance modes at the same time. For example, the Shenzhen Longgang High School Education Group (Longgao Education Group) has set up an administrative committee, in the management level of the group, it set up a few overall administrative departments such as the administrative service center, student development center, course teaching center, international education exchange center, and logistics center, etc. For member schools that were already independent legal entities at the time of group formation, they still adopt the legal person system, their manpower, financial and material are managed separately, and the legal persons are the principles of the member schools. For newly established schools, the legal persons are the general principle of the group, and their manpower, financial and material are managed by the group. For alliance schools, after they signed agreements with the group, they can exchange teachers, share courses, and carry out international communication and cooperation with other members [22].

#### **2.4 Problems with basic education group governance**

As a new born thing in the education field, basic education groups are still developing, the governance structure is incomplete, and there are a few problems with the newly established groups.

First, there is not a mutual restraint mechanism between the interest parties. In terms of the governance structure formulation and mechanism construction of basic education groups, the principal often has the absolute authority, and there might be situations that the principal has the final say while the leaders and teachers of each campus have no right of speech, it's difficult to realize democratic governance, and the other governance subjects do not have a good channel to realize their rights [23].

Second, the information communication between governance subjects is not smooth. Essentially, a basic education group is an education organization with teachers and students as its core. As important parts and interest parties in the group, teachers, students, and students' parents should be able to put forward their own ideas, and various communication channels should be established for them. However, the actual situation at present is that the communication and exchange platforms and the relevant facilities are incomplete, communication channels are insufficient, resulting in that many student parents and teachers are unable to express their opinions and suggestions, which has seriously affected the operation efficiency of the basic education groups [24].

Third, the increase in the physical distance between management levels has led to a decrease in the operation efficiency. Under the grouped schooling mode, one school would have multiple campuses, which have enlarged the scale of the school, and the increase in the physical distance between campuses has increased the time and cost of personnel flow. The increase in the management levels and internal administrative organizations not only makes the management organization and personnel redundant, increases the internal management cost of the group, but also causes waste in human resources. An improper management mechanism would lower the operation efficiency of the group [25], and lead to poor information flow at the same time [26].

Fourth, the supply of excellent teachers is insufficient. With the continuous expansion of the scale of education groups, the contradiction between the supply and demand of high-quality resources has become increasingly prominent, and the primary problem is the insufficient supply of excellent teachers. Under the grouped schooling mode, in order to build new campus, famous schools need to output many excellent managers and teachers, which may dilute the existing high-quality educational resources.

Fifth, it is more difficult to allocate materials. Some basic education groups may run schools across regions or even across provinces, since the manpower, financial, and material resources are often managed by different departments, it becomes more difficult to allocate them uniformly.

In summary, all the five problems mentioned above are partly or completely related to information channels, and they can partly or completely be solved by applying information technology, shortening time and space distance, and improving the level of informatization.

### **3 Mechanisms of optimizing the governance structure of basic education groups through information technology**

Viewing from the perspective of industrial organization, the wide application of information technology has made it an important production factor and strategic resource, and it is driving the global industrial structure to restructure and the enterprises to transform and upgrade. In theory, information technology affects the industrial organizations in three ways: the first is to change the structure of the industry; the second is to support the creation of new industries or new businesses; and the third is to improve work efficiency and help enterprises obtain competitive advantages. As a type of industrial organization, basic education groups are also deeply affected by the information technology.

First, information technology helps to change the governance structure of basic education groups. Using the high-speed communication function of the information platform, the governance structure of basic education groups can be transformed from the straight-line mode to the business unit (branch school) mode, then, the group leaders could be free from routine affairs, and concentrate on overall and global issues; business units (branch schools) cooperate and compete with each other, which is conducive to the overall development of the group; the resources within a business unit

(branch school) are easier to allocate, unlike the straight-line mode, high-level management departments do not have to intervene it, and the adjusted governance structure is more suitable for the sustainable development of basic education groups.

Second, the wide application of information technology expands the business coverage of basic education groups. Guo Ping and Li Yingjie proposed in their study that informatization has an all-round impact on the traditional governance structure [27], and they pointed out that the widespread application of the Internet has greatly reduced the time and space distance of the communication between people. Especially during the COVID-19 epidemic, the application of online learning systems and cloud classrooms has extended the boundaries of basic education groups and expanded their business scope. Now, many basic education groups have branch schools and franchise schools across the country and even the globe, and such achievement is inseparable from the wide application of the Internet.

Third, the wide application of information technology has improved the operation efficiency of education groups. The course live broadcast system enables excellent teachers to teach to all via the Internet, and it can quickly spread high-quality education resources. The network video conference system makes the communication between the group members more convenient and faster, which not only saves time and costs, but also improves the efficiency of governance. The open network communication platform allows teachers, parents, communities, and other interest parties to easily participate in the governance process of the education group, through the platform, they can offer ideas, propose suggestions, and supervise the governance. By employing financial information system, education groups can improve their financial management, solving problems such as the adverse effect caused by lagging financial information or too-slow financial information feedback on the group governance. Also, by employing material management system, education groups can reduce costs by expanding the scale, and flexibly allocate material resources within the group in a timely manner.

#### **4 Current status and problems of the application of information technology in basic education groups**

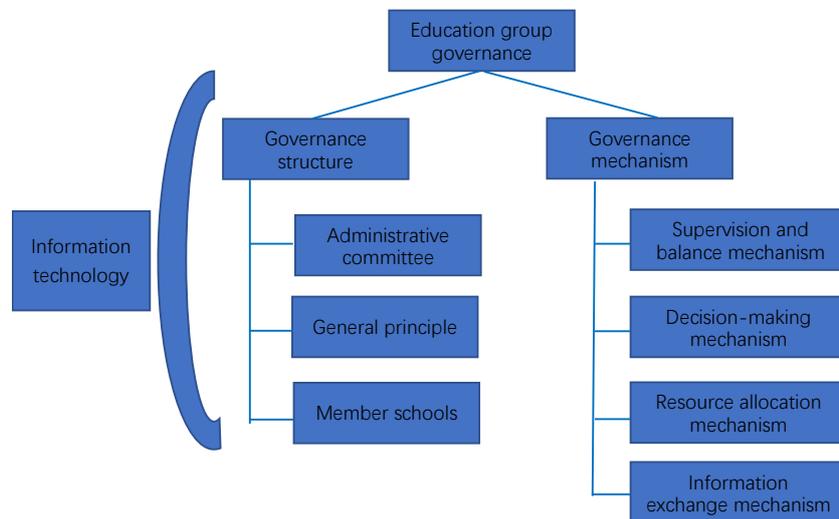
Generally speaking, basic education groups in China have made great efforts in the application of information technology, and achieved certain results in terms of Internet, big data, and cloud computing, etc. For example, Hangzhou, the birthplace of basic education groups in China, has adopted three main measures to promote the application of information technology in basic education groups, including building public service platforms of education videos, establishing online schools, and inviting famous teachers to teach online, etc. Another example is the Hefei Nanmen Primary School Education Group in Anhui province, via remote online classrooms, students from the famous core school and branch schools can share the teacher resource; the time and space distance can be shortened by the video conference system; online classroom and video conference can greatly improve the teaching and research efficiency of teachers, they can immerse in the classroom atmosphere even though they

might be a thousand miles away. The development of micro-courses and the construction of the micro-course systems have changed the learning method of students, made the best use of the famous teachers in the education group, and realized resource sharing.

However, the application of information technology in basic education groups still faces many problems, and more attention is still required [28]. The main problems include: first, the application of information technology in basic education groups is common, but not yet in-depth enough, and the application of cutting-edge information technologies such as big data and blockchain is still insufficient; second, there's no standard for information construction and there're some information islands; due to the lack of interconnection between systems, data mining and intelligent analysis results are not sufficient enough to provide support for decision-making; third, more emphasis is given to internal education management systems, while the systems and applications constructed for parents, communities, and other interest parties are far from enough.

## 5 Application of information technology in improving the governance of basic education groups

Referring to the research results on the improvement of corporate governance [29], this paper proposed an analytical framework for using information technology to optimize the governance of basic education groups, then, centered on the proposed framework, this paper also explored the roles of information technology in it.



**Fig. 1.** Analytical framework for optimizing basic education group governance with information technology

### **5.1 Improve governance structure**

In terms of improving the governance structure, with the help of the information technology, information can be transmitted directly from the bottom grades and teachers to the senior executives of the group in a timely and accurate manner; at the same time, based on the decision-making supporting function of information technology, a collaborative information processing and decision-making mechanism could be formed in the level of bottom grades. Due to the direct connection of information, the role of middle levels has been weakened, which makes the realization of a flat organizational structure become possible. Therefore, using information technology to optimize the governance structure of the group is an important manifestation of the application of information technology in group governance.

### **5.2 Improve governance mechanism**

The first is the supervision and balance mechanism. The application of office and financial management systems based on big data and blockchain can realize open and real-time online communication and it facilitates supervision and balancing.

The second is the decision-making mechanism. The application of intelligent decision-making systems based on cloud computing and big data can offer powerful support for data collection and sorting, data screening and analysis, as well as corporate governance assistance and decision-making, etc., and it can improve the accuracy and scientificity of the group governance decisions.

The third is the resource allocation mechanism. Based on cloud computing, by setting cloud classrooms, launching open courses of famous teachers, and sharing excellent course and teacher resources, the full-coverage of high-quality resources could be promoted, and the flexible resource allocation that breaks the limits of time and space could be achieved as well. Moreover, by constructing ERP systems and centralized procurement and management systems, flexible cross-region material allocation and optimized resource allocation could be achieved.

The fourth is the information exchange mechanism. Through the established information exchange platforms, various parties in the basic education group, including teachers, parents, students, and the communities, can have a good understanding of the group's status and plans, and participate in group governance by giving opinions and offering suggestions.

## **6 Conclusion**

This paper sorted out the current status of the governance of basic education groups in China, explained the connotation of basic education group governance, summarized the governance modes of basic education groups and their problems, and analyzed the mechanisms of applying information technology to improve the governance performance of basic education groups; the three mechanisms are: first, the application of information technology changes the governance structure of basic education groups; second, the wide application of information technology expands the

business coverage of education groups; third, the wide application of information technology improves the operation efficiency of education groups.

Aiming at the problems with information technology application and the mechanisms mentioned above, this paper proposed a few ideas for applying information technology to optimize the governance of basic education groups, including realizing a flat organizational structure through direct information connection, forming a supervision and balance mechanism based on information systems, optimizing the decision-making mechanism, and constructing resource-sharing and information-exchanging mechanism.

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