Research Article

Innovation and Development of University Education Management Informationization in the Big Data Environment

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With the arrival of the big data era, the role of big data can be fully utilized, and the comprehensive data evaluation is carried out to perform education information evaluation. In the general circumstance of computerized learning, college teaching regulation has new features and novel orientations. Along with the speedy progression of sci-tech, the pace of dissemination of data is continuously quickening, and it is being increasingly easy for the public to interact and carry on with their lives. Because people use the network to access a variety of data information, the system cannot handle huge amounts of data; this is the cause of the era. In the process of the comprehensive approach of the information age, with the impact of the Age of Big Data, the administration of intelligence in universities has transformed. Big Data InfoTech has infiltrated into all realms of community lifestyle. How to cope with the transformation of informationization of university education management in the era is a serious challenge for relevant personnel. This study begins by discoursing the essential implication of big data, followed by a diagnosis of the questions involved in the establishment of computerization in high schools under the environment of big data, comprising the imminent solutions to the dilemmas in collegiate education maintenance, the issues raised by privatization in high schools, and the strategies for education management. This is followed by the proposal of the innovative educational administration informationization development trend in the big data context. In this research, there are 11 professors in the expert group, accounting for 44%, 8 associate professors, accounting for 32%, and 6 lecturers or below, accounting for 24%. This study makes full use of a large number of procedural data generated in educational management activities to achieve an efficient, comprehensive, accurate, and objective evaluation, which provides strong technical support for educational management informatization evaluation.

1. Introduction

It can be seen that the current assessment index system is mainly for the overall information development of colleges and universities. Although management informationization has been widely recognized as a dimension in university information assessment, the relevant management information evaluation indicators are still more. Simply, there is no comprehensive evaluation index system for education management informationization, and most of the current education informationization indicators are based on result ability data and ignore the potential value of process data. It is a strategic choice for education reform and development to drive education modernization with education informatization to promote the leap-forward development of education. College education informationization is an important part of educational informational undertakings. It is an important way to promote higher education reform and cultivate innovative talents. It is the leading edge of educational information development. The informationization construction of colleges and universities has greatly promoted the development of education and has brought tremendous changes to teaching methods, educational concepts, and educational systems. This change is both an opportunity and a challenge. Colleges and universities should be able to conform to the requirements of the times and establish a more effective and brand-new resource integration model in education and scientific research. This resource integration model is an innovation in education management. Humanity has attained an epoch of

materialization: the period of computerization [1]. The breakneck expansion of information technologies has elicited far-reaching modifications in many arenas and quickened the headway of the InfoTech community [2]. At the same time, with the speed-up of the worldwide socioeconomic consolidation process, the scale of informationization has been established as a key indicator of the socioeconomic competitiveness and state of the art of a country and region, as well as an important indicator of the level of consolidated national power and modernization. Level of industrial expansion. In the traditional sense, the education and teaching environment of campuses, classrooms, libraries, etc., have quietly changed, and the time, space, methods, concepts, and systems of education and teaching have also changed a lot. This kind of change is both an opportunity and a challenge. Colleges and universities should be able to adapt to the requirements of the times and establish a more effective and new resource integration model in education and scientific research. This resource integration model is an innovation in education management. It should involve innovations in many areas, such as management thinking, management methods, management content, and management organization. For colleges and universities, the object of management must also be innovative. Innovation in every position and management object of a university is necessary and possible [3]. With the development and popularization of the Internet, the data generated by college education informationization has increased, and massive data are also hidden, and these data are treated, and it is important to assess education informationization in colleges and universities.

2. The Basic Connotation of Big Data

The first one who referred to the era of "big data" was the world renowned McKinsey and Company [4]. McKinsey said that "the dynamics of all spheres of industry are permeated through data enablement, and data have emerged as an essential ingredient of manufacturing. The sheer volume of data that people are probing and applying heralds a new cycle of higher productivity and the onset of consumer excess" [5]. Big data generally refers to the quantity of more than 1 TB, also known as massive data or huge amounts of data [6]. However, for the big data difference and the small data volume limit, academic circles have different opinions. However, it is widely agreed that the large capacity of big data is a relative statement, which contains a combination of multiple data points across different types, different things, different industries, and different fields. The era of big data is not about mastering data, but more importantly, the use of data [7]. Big data are an invaluable tool for the management of all segments of society. One can visualize big data to estimate the magnitude of the possibilities of devastation and anticipate the growth so as to enable appropriate solutions to be given to the situation effectively [8]. With the rapid development of big data, countries have given high attention, accelerated their layout in education, and released national strategic planning.

3. Problems in the Innovation of University Informationization under the Big Data Environment

3.1. Difficulties in the Management of College Education

3.1.1. Lack of Understanding of Education Management Informationization. The assessment is an important means of promoting the development of education in colleges and universities. At present, some scholars have carried out research on educational informationization in colleges and universities and have also proposed some college education information evaluation indicators [9]. However, the current college education information assessment is a simple management information indicator for the overall information development of universities [10]. As the pioneering position of the computerized version of education, the process of informationization of tertiary institutions has had ever-increasing effects on the instructional work of tertiary institutions. In the previous sense, the educational and teaching environments such as campuses, classrooms, and libraries have quietly undergone astonishing changes, and the quality of hours and spatial scope of instruction has also significantly evolved. In order to better develop and construct the informationization of education management in colleges and universities, it is necessary to have a correct and in-depth understanding of the connotation of education management informationization. It is necessary to truly recognize the revolutionary impact of information technology on education management informationization and establish a modern, scientific, and information-based education management concept in the process of education management informationization. At the moment, most universities in China are limited in the connotation and growth of computerization in teaching administrations, and they have not been considered from a long-term perspective. Many college teachers and students, administrators, and even some leaders believe that education management informationization is the application of information technology in education management. Simply use the application of information technology in education management as education management informationization and ignore modernization. The scientific education management thought and systematic management concept play a leading role in the construction process of education management informationization. College education management information is a work in each department associated with the school, including teaching education management, scientific research and education management, personnel education management, student education management, and experimental equipment education management [11]. If there is no corresponding support for education management information, the information processes in other fields in colleges will encounter problems in many coordination and management.

Suppose the determinant of a certain judgment matrix is

$$A = \left(a_{ij}\right) = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}. \tag{1}$$

Normalize each column of the judgment matrix:

$$\overline{a} = \frac{a_{ij}}{a_{kj}}. \tag{2}$$

Each column is normalized, and the judgment matrix is added row by row:

$$\overline{w} = \sum_{i=1}^{n} \frac{a_{ij}}{a_{kj}}. \tag{3}$$

In addition,

$$\overline{w} = (\overline{w}_1, \overline{w}_2, \overline{w}_3, \dots, \overline{w}_n). \tag{4}$$

When the judgment is completely consistent, then

$$\lambda_{\max} \approx i \sum_{i=1}^{n} n. \tag{5}$$

The calculation formula for solving $\lambda_{\max}$ is as follows:

$$\lambda_{\max} \approx \sum_{i=1}^{n} n \frac{(AW)_i}{nw}. \tag{6}$$

3.1.2. Lack of Systematic Planning for Information Management of Education Management. The study built a data-driven index system at the information level of college education management, providing theoretical guidance and support for the information evaluation of college education management. Related to subsequent education management information evaluation, the study gives a certain reference. The "data" of the information age have become a vocabulary that everyone is talking about. With the continuous expansion of the scale of colleges and universities, the large increase in the number of teachers and students, and the increase in business departments, the data have reached an alarming amount. Many data centers have the phenomenon of repeated construction, and different systems are independent of each other [12]. These basic data cannot be synchronized and shared in real time. In this case, each college and various functional departments not only have to pay for the maintenance and update of the system and the back-end database by themselves, but once some data problems occur, the original data may be lost [13]. These problems arise because the system is not unified and the data are not integrated. It is necessary to have a clear and unified scientific plan for the development of education in the whole school and introduce the concept of information flow into the construction of the education regulation system of colleges and universities. Build a data stream-based information system to achieve the mutual circulation of messages and data between various functional departments. How to comprehensively use the result ability data and process data to create an objective, accurate, and efficient assessment of the information level of college education management?

3.1.3. The Overall Quality Level of Education Managers Is Likely to Decrease. Education managers have a complex information; they are likely to be confused when choosing, especially when obscure content appears, such as all kinds of confusing information, which makes judgments difficult, and management or decision-making is also very easy. Because of the limitations of information technology and the monopoly of information sources and procedures, the system is systematic, standardized, and procedural. This can not only cause direct and one-sided but also allow people to react linearly without any effort, making the behavior rigid. If administrators rely heavily on informative resources, they are detached from practice as they are unable to probe independent topics. The abovementioned behaviors will adversely affect the overall quality development of educational administrators.

3.2. Problems Arising from the Informationization of Education Management in Colleges and Universities

3.2.1. The Management Concept and System Are Lagging behind and the Understanding Is Superficial. In order to complete more work in a unit of time and improve management efficiency, coupled with the inability to coordinate the relationship between management and service, some colleges and universities have caused the phenomenon of "emphasis on management and lack of service in the process of building education management information." Many managers are self-sufficient in the sense of "manager" and neglect the role of being a "server." Some teachers and students believe that the more informational, the more cumbersome and complex the process of handling various matters and business, that the school is to complete the surface engineering and information.

Achieving high quality, high matching, and rich service content of job search information is the goal of future website construction. It is necessary for Chinese universities to further integrate internal and external resources, excavate internal and external information in the education system, establish information associations, and promote the release and use of information value. Realizing "big data" worthy of the name is large in quantity and value. Figure 1 shows the distribution of smart employment platforms used by universities in different cities.

In terms of teaching information management, colleges and universities attach different degrees to it, but the problems are there. First, the degree of understanding and the corresponding plans and mechanisms have not been established and improved, and they have not been given enough attention. Some institutes, moreover, ignore the key mandate of investment in educational administrations, heavy governance; in respect of organizational settings, staffing matters have not been dealt with, no equivalent workforce for informatization and commercialization of the scientific construction, lagging behind in thoughts, and still, in a complex and messy context, a lot can be done, and at this point, application of infotainment and administration cannot be implemented productively. There are three stages in the development of big data in colleges and universities: management is the main use and supplemented,
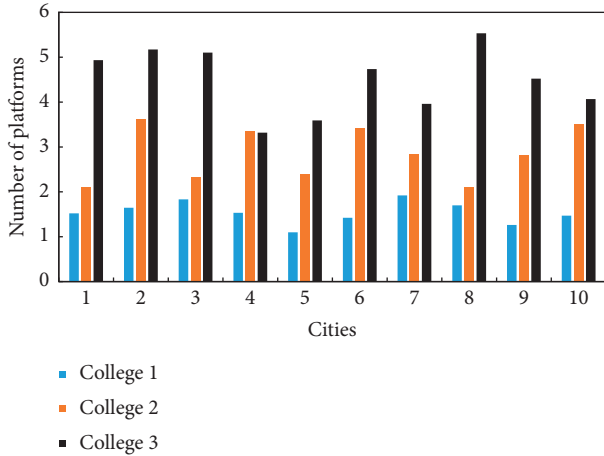
Figure 1: Distribution of smart employment platforms used by universities in different cities.

Table 1: The big data-sharing situation of universities.

Serial number	Big data park name	Data-sharing rate (%)
1	Big data base	20
2	Big data new district	22
3	Big data park	18
4	Data valley	18

Table 2: A comparative analysis of the number of indicators at all levels under the first dimension.

Years	2017 (%)	2018 (%)
Infrastructure	14	22
Digital teaching resources	23	22
Teaching and learning applications	28	28
Management information	18	11

management and use are equally emphasized, and management is the supplementary use. It is still in the first stage, and there is a widespread problem of "emphasizing construction and light utilization." The big data-sharing situation of universities is shown in Table 1.

In order to further understand the development trend of the evaluation index system at the higher education informatization level, with reference to the representative index system with common characteristics in recent years, a comparative analysis of the number of indicators at all levels under the first dimension is carried out, as shown in Table 2.

3.2.2. The Construction of Information Resources Cannot Keep Up with the Development of the Times and There Are Problems in the Development of Information Systems.
The basis of education management informationization is mainly the powerful construction of information resources, but the construction of information resources is very backward in China [14]. First, there is a lack of guidance and coordination of a strong education administration. Second, there is no communication between universities, and there is no basic starting point to unify and support each other [15]. Third, there is little communication and collaboration between the various departments within the school. The decentralized departments each carry out work arrangements on the management information system about the department, which means the data are collected multiple times, increases the burden of work, makes the overall work of the school not effectively improved, and wastes manpower. Colleges and universities should not only concentrate on hardware and software management personnel but also pay the same attach to the training of education and management personnel at all levels to improve practical application capabilities, information literacy, and the reserve of knowledge in information technology.

In the construction of information systems, sufficient human, material, and financial resources should be invested. An information system is very important as software for integrating information across space [16]. Therefore, in the

construction process, also consider leaving enough time for development. Software developers are required to have extensive software development experience. Not only is it prominent in programming skills but also it requires relevant educational management experience. Or those involved in system development need to be good at communicating with relevant education management personnel to accurately meet customer needs. Of course, colleges and universities do not necessarily say that they must fully develop their own educational information systems. They can engage with existing companies that are well made in the education management information system and introduce relevant resources [17]. Under such measures, the pace of information construction in schools can be accelerated, and follow-up related work can be facilitated to achieve efficient management.

3.2.3. Problems in the Orientation of Education Management System and Team Building.
As an ordinary university, especially a new university, the education management system is a school year system. If the direct leap of the credit system is fully implemented, teachers and students cannot fully adapt to the existing management. In the education management system, the orientation of the credit system education management system, and the gradual transition of the credit system education management system [18], the teaching plan conforms to the teaching law and is stable for a period of time, but in the long run, it must be adjusted and revised in time to suit the new environment of society, the progress of the economy, and science and technology.

Among the various indicators, the evaluation criteria have clear regulations and are based on the principle of simplicity and operability. The informationization of education management places higher demands on the integrated caliber of the evaluation and administrative team. Education managers must know the current educational philosophy, have rich management knowledge, and know how to continue to innovate. Since the system is fully dependent on the network platform, network technology must also be mastered. Therefore, education administrators must have high quality and comprehensive development talents. Therefore, universities should pay attention to the regulation of hardware and

software and also to the training of personnel at all levels of educational management and improve their knowledge of practical application, information literacy, and information technology [19]. Moreover, the system of information management should be sound, especially the system of assessment and reward and punishment. These systems can only motivate and promote the development of information management teams if they are scientifically standardized.

Professional title and educational background: to a certain extent, the level of a professional title can measure the authority of an expert in a certain field and reflect the expert's research level in the field. The higher the professional title, the more representative the research results. In this research, there are 11 professors in the expert group, accounting for 44%, 8 associate professors, accounting for 32%, and 6 lecturers or below, accounting for 24%. There are 3 people with a postdoctoral degree, 11 people with a doctorate degree, 9 people with a master's degree, and 2 people with undergraduate (bachelor), as shown in Figure 2.

On the whole, from the perspective of the development of higher education informatization evaluation indicators, with the continuous development of information technology, the focus of the evaluation index system of higher education informatization level has gradually shifted from infrastructure to teaching and learning applications, and emphasis on information technology and teaching applies deep integration to change the traditional education model, change students' learning methods, and use information technology to improve student's learning ability. Figure 3 can laterally reflect that my country's construction of guarantee mechanisms and management informatization is slightly faster than other aspects. Figure 3 shows the development process of the evaluation index system of higher education informatization level.

The first round of expert evaluation of infrastructure indicators is shown in Table 3, involving two secondary indicators, namely, the campus network and the complete construction of equipment configuration. Experts tend to concentrate on the choice of infrastructure, with more than 90% of those who choose "necessary" options. Among them, 23 people in the "campus network" chose the "necessary" option, accounting for 92%; 2 people chose "unnecessary;" the selection ratio of the "necessary" option of "equipment configuration and construction" reached "96%," and the selection of experts was good.

Determine the distribution of the number of teachers at different evaluation levels according to the evaluation standards for the level of higher education informatization. The level distribution of university education informatization levels is shown in Figure 4.

3.3. Factors That Cause Problems

3.3.1. Understand That Education Management Information Is Not Comprehensive Enough. For the importance of teaching information management, the level of understanding of colleges and universities is different, the planning and decision-making mechanisms are not comprehensive enough,

and the arrangement of relevant personnel is not reasonable enough. The scientific management mechanism of the complete set has not been developed so far. According to the statement, computers can replace the role of the office [20]. Computers are connected to the Internet, and modern education management is informatized. Some managers fear that the enthusiasm of employees will be weakened by the deepening of information technology.

3.3.2. Less Policy Support and Cooperation Mechanisms. The opening of colleges and universities benefits from the informationization of education governance, and the sharing of information resources benefits from the opening of colleges and universities [21]. Under the contemporary policy, colleges and universities have their own operating systems with relatively closed interests, resource sharing, redistribution of teachers' individual rights, and innovations in support and reconciliation methods. These are all urgent problems. Furthermore, the requirements of teachers' comprehensive quality should be reflected in the ability to adapt to the information age and should be innovated and improved in the evaluation of their teaching. Therefore, the creation of a scientific system of educational governance is necessary [22].

3.3.3. The Construction of the Teaching Staff Cannot Keep Up with the Pace of Informatization Construction. First is because of the entrenched influence of traditional educational concepts on teachers. Second, in the new era, there are more requirements for teachers' abilities, whether it is knowledge structure and specific knowledge such as management knowledge and technical knowledge, as well as thinking and an excellent ability to integrate book content and network information. The conscious use of information technology in teaching activities is also a must. However, among the current teaching staff in Chinese universities, these qualities and abilities are relatively weak, so the requirements of education management work in the context of informationization and scientificization are not easy to achieve [23].

3.3.4. Limited Funds for the Construction of Education Management Information. The system is a complex whole, composed of a series of hardware and software [24]. Funding must be supported at the outset to ensure smooth progress. However, with today's financial problems, China's colleges and universities have difficulties; it is difficult to ensure that there are sufficient funds, thus limiting the progress of information construction in education.

4. The Development Strategy of College Education Management Informationization under the Big Data Environment

4.1. To Be Based on the Network Platform. With the influence of big data EON, the knowledge needs of teachers and students are difficult to meet, so we should transform
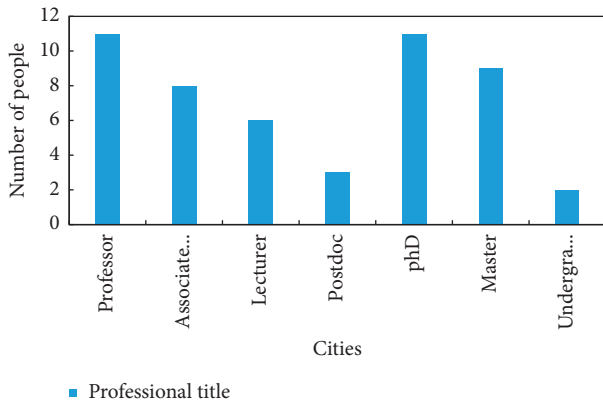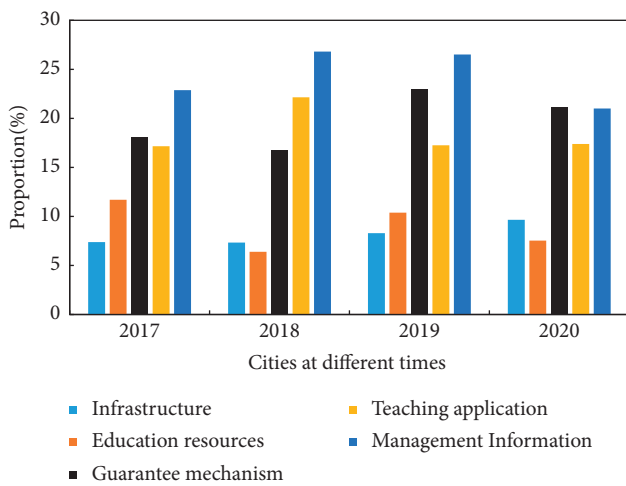
FIGURE 2: Level of a professional title.

FIGURE 3: The development process of the evaluation index system of higher education informatization level.

communication platform for education and sharing information, and promote the goal of open data and fair measures, to meet the needs of the majority of teachers and students in the data, effective data, and information port of the university management and to enhance the visibility of colleges and universities.

4.2. Improve the Management Informationization of Schools. To improve people's handling of corresponding data problems, grasp the root of the problem, find the root cause of the problem, and solve the problem completely is the main purpose of big data. In the traditional data management mode, due to the one-sidedness and subjectivity of decision-making, the data do not have integrity and consistency. However, by rationally and scientifically applying big data, this problem can be solved perfectly. In order to better innovate the reform, we should replace the unscientific management model with a new management model. The implementation of decision-making in colleges and universities is restricted by the self-control and willpower of all people on campus. Therefore, it is necessary for the management to vigorously promote the implementation of human management. The development should be considered from a long-term perspective. Decision-making adopts scientific and reasonable prejudgment methods, rationalizes the definition of the specific needs of teachers and students, and implements detailed distribution of daily management [26]. The construction and promotion of big data technology in colleges and universities need to be continuously expanded, and the education model should be transformed into a data-based establishment. The data of business intelligence technology is mainly provided by the manager. This technology is used by the public enterprise and does not involve the adoption of colleges and universities. However, from a broad perspective, business intelligence technology can be widely applied to the reform of university management information. The corresponding concepts and strategies are the main points of business intelligence, and the relevant data need to be rationalized and applied in combination with the actual basis to provide better judgments and decisions for managers.

4.3. Improve Network Security Construction. Under the influence of the era of big data, schools should use the standards of the new big data era to require the construction of information-based campuses and thereby enhance the status of the campus network in education, data management, and daily teaching. Meanwhile, teachers also need to guard against the teaching loopholes that arise during the education and teaching process. Colleges and universities should timely remedy and prevent network security protection and use information leakage as the main prevention purpose to avoid it in advance [27]. At the same time, real-time monitoring is applied to the information network environment, and system vulnerabilities and remedial measures are implemented for the network monitoring system to prevent system vulnerabilities, and bugs on some campus websites should be repaired on time. The primary

traditional education and teaching methods to achieve this goal. Every educator needs to combine big data thinking with actual daily work. After analyzing the data, the corresponding strategy is formulated according to the actual needs. In turn, the big data management method and the teaching work can be combined and realized, and the development of education can be promoted. During the traditional education and teaching process and the implementation of teaching information, under normal circumstances, the development decisions of colleges and universities are mainly based on the experience of running a school. However, under the influence of the era, the main factors of teaching include the leading factors of teaching experience and management as well as the opinions of students. Only through systematic analysis and exploration of these data selection and formulation can the best teaching method be achieved [25]. Using actual data, it is possible to achieve the goal of targeted management according to the actual situation, and it can also promote enthusiasm for teaching activities. Considering the materialization of big data from the perspective of colleges and universities, schools must concentrate on promoting the informationization reform of education, constantly improve the network

TABLE 3: The first round of expert evaluation of infrastructure indicators.

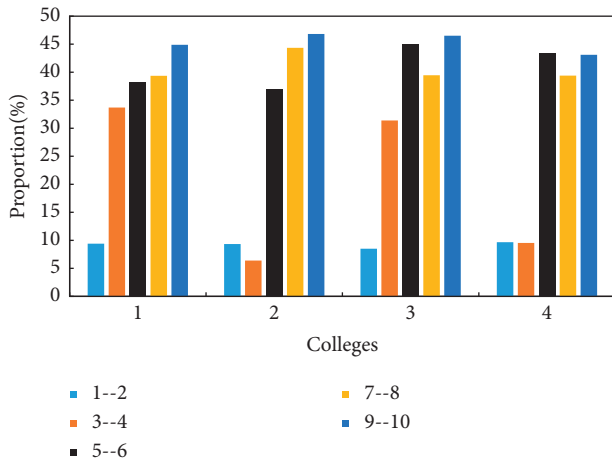| Index and index level | Indicator options | | | | | |
| Secondary indicators | Necessary | | Unnecessary | | Uncertain | |
Campus network	Number of people	Proportion (%)	Number of people	Proportion (%)	Number of people	Proportion
Complete equipment configuration	23	92	2	8	0	0
Index and index level	24	96	1	4	0	0

FIGURE 4: The level distribution of university education informatization level.

purpose of building cybersecurity is to better maintain data security and provide better protection. Although the damaged device can be repaired and the vulnerabilities are fixed, it is impossible to completely repair the lost data. Since the personal information of all teachers and students in the university is included in the campus network, the security of the internal network management server of the university must be further strengthened. The management authority and access rights for accessing the campus network should be rationally deployed. The faculty of the network management team in the university and the management of the relevant personnel should be strictly strengthened so as to ensure that the relevant personnel of the project have the corresponding professional qualities in line with their positions.

4.4. Building a High-Quality Education Management Team. Education administration not only is a general administration but also has the dual capabilities of scholarly stewardship and bureaucratic supervision. Without a strong education management team, it is impossible to have a first-class teaching level and teaching quality. In the information age, only by improving the overall quality of the education management team can we not fall behind in the development process of colleges. First is the quality of education management. Since the education management team is composed of individuals, it is the key to establish a high-quality management team and cultivate the quality of education management personnel. Training, education

management, and education management can invite experienced teachers and specialized personnel to enter the training. After that, we should deepen the mastery of knowledge, such as psychology and management science education, and also improve the information quality of students, especially in computer and network technology, so that they can effectively use the campus network and Internet to work and study. Furthermore, it is necessary to improve the quality of the education management team in the university and to further develop the whole. This is related to the personal qualities of the education management personnel and the overall situation of the education management team. If the structure is reasonable, people can help each other, and mutual promotion will make people feel a more sense of collectiveness and, at the same time, facilitate the strengthening of cohesiveness and centripetal force; it is convenient for people to actively create and develop so that the overall role of the education management team is better. In the end, enthusiasm is critical, so it is necessary to establish a system of competition and incentives to guide the management of cadres, thereby increasing enthusiasm. Responsibility, system, and reward and punishment are the three main links of the postresponsibility system [28]. The implementation of the corresponding policies will play a significant role in the improvement of the enthusiasm of education management, such as the evaluation of titles, the management of teaching staff, and other issues. The inclination toward preferential policies will inevitably increase people's enthusiasm.

5. Conclusion

Foreign countries have more results in the research of college education informationization indicators but, basically, stay in the macrolevel of education informationization. Domestic information on education has also carried out a lot of work, and university education information has begun to develop in the direction of application services from infrastructure construction. With the application of various information technologies in the field of education, it will inevitably affect the educational concepts, forms, and methods of modern society. How to fully apply modern information technology in today's information age is a hot issue in various disciplines in the current education field. The ongoing expansion and updating of InfoTech have disrupted the management and business paradigms of legacy estates, and education is no exception. The developed countries abroad attach great importance to education

informatization and practice innovation and have achieved remarkable results in higher education. Big data technology has become an inevitable trend of education reform and development. The development in line with the trend of the times is a practical matter that should be recognized by university administrators. The information age brings convenience to people, but it also requires relevant personnel to improve the level of information technology, otherwise, it is difficult to rationally apply this information software. Therefore, efficient managers should take advantage of the development of the great era, significantly propel the progress of informationization of enterprise education governance, and promote the comprehensive merging of big-scale data technology and innovation in education, providing guidance and advice on the information development of college education management through assessment practice, providing decision-making support for the education management informationization of universities, and also providing demonstration cases for information-driven university education management information assessment practices.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

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