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Evaluation on Innovation and Development of University Education Management Informatization Construction Under the Background of Big Data

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ABSTRACT

The purpose of this article is to discuss the innovation and development of university education management informationization construction in the context of big data. Through a comprehensive comparison of innovative and traditional university education management information systems, it reveals the advantages of the innovative model in terms of flexibility, efficiency, data-driven decision-making, and personalized learning. The questionnaire survey and comparative analysis reveal the positive impact of big data on education management. However, it also reveals the limitations of the innovative informationized education management model, which requires more technical input and security. Finally, future research suggestions such as integrating data from multiple sources, promoting personalized education, and incorporating artificial intelligence are proposed to promote the innovation and development of information technology construction for education management in universities. This study provides insights and guidance for university administrators and researchers.

KEYWORDS

Big Data, Higher Education, Management Information, Management Systems

INTRODUCTION

With the acceleration of economic integration and the rapid development of IT focusing on network communication and multimedia technology, the degree of informatization has become a necessary standard to measure the competitiveness of a region. The innovative education management construction method proposed in this paper adds new features to the traditional education management mode, opens up a new direction, and fills some gaps in the management construction process. It also improves the traditional education management mechanism to a certain extent and sets a higher standard for the quality of education managers.

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Information technology refers to using computer technology, network communication technology, and other related technical means to collect, process, store, transmit, and display information as the primary goal of a class of technical systems. The development of information technology has not only profoundly changed people's way of life and work but also triggered revolutionary changes in various fields. In the field of education management, the application of information technology is becoming more and more widespread; through the establishment of information technology systems, platforms, and applications, it is possible to achieve efficient management and optimization of educational resources, teacher and student management, curriculum, teaching evaluation, and other aspects. With the arrival of the big data era, information technology is not only limited to essential information processing, but also includes the collection, analysis, and mining of large-scale data, to provide a more accurate and scientific basis for the decision-making of university education management. In this paper, we will discuss how to innovate and develop the construction of information technology for educational management in colleges and universities under the background of big data, and evaluate and analyze it.

Under the background of big data, information technology has a profound and positive impact on the innovation and development of the informationization construction of university education management, which especially presents significant changes and potentials in teaching methods. The new application of information technology has brought unprecedented opportunities for the evolution of teaching methods, thus injecting new vitality into college education. First, information technology provides strong support for personalized learning. By using big data technology to analyze students' learning data, teachers can better understand students' learning characteristics and needs, and then customize learning plans for each student to achieve precise education. Secondly, the introduction of real-time feedback mechanism makes teaching more flexible and interactive. Teachers can use online tools to monitor students' learning progress at any time and adjust teaching strategies in time to better meet students' learning needs. In addition, information technology has advocated a new model of blended teaching, combining online and offline teaching to provide students with more diverse and independent learning opportunities. The use of big data technology also helps to optimize the teaching content, and through in-depth analysis of students' mastery of different knowledge points, teachers can carry out targeted teaching design and improve teaching effectiveness. Overall, the impact of information technology has led to positive changes in teaching methods in the era of big data, which provides strong support for the innovation and development of the construction of information technology in college education management.

Based on information technology practices, we explore three new practice principles: visualization, individualization, and immediacy principle. The innovation of the research is to use big data technology as the starting point for improving the current stage of the education informatization work of colleges and universities, through the combination of data analysis and the latter, to realize the comprehensive informatization innovation of education management. Soto-Acosta et al. (2018) find that these five universities have common problems in this field. Dabas (2018) analyzes information services reform in university physical education based on artificial intelligence technology and conducts in-depth and innovative research. According to the results, the main problems are the lack of belonging, poor information transmission, and the disconnection between class and tutor management. Given these problems, a big data technology optimization and improvement scheme based is proposed. The development of college students is a social problem that must be focused on in higher education under the background of China's powerful human resources (Cupiał et al., 2018). Pettersson (2018) explored and studied the sustainability of HE institutions, the construction concept, and the challenges in the implementation process. Using the method of semi-structured interview and resource integration analysis, the importance of the development and transformation of higher education institutions was determined, especially in the aspects of higher education informatization construction and sustainable development, which contributed to improving HE management informatization construction (Pettersson, 2018). Wang and Wu (2021) built a Management System (MS) to prevent and reduce

the adverse consequences of the local epidemic crisis. They determined that IT can enhance the responsiveness and flexibility of management construction. The use of innovative MSs can reduce implementation risks and enhance effectiveness (Wang & Wu, 2021).

To better play the role of the BD era, meet social needs, and constantly improve and scientifically refine traditional education management tasks, teaching has improved informatization in teaching practice for college teachers in the construction of education MI. Macdonald et al. (2018) comprehensively explored the driving factors and obstacles of the use of IT in MSs, and found that most of the evaluation results of traditional MSs were unclear, while most of the information technologies were mature and reliable. The evaluation management method was cumbersome and too dependent on professional knowledge and manual implementation. Technologies such as high automation, BD computing, and timely feedback graphic display promoted management and construction informatization (Macdonald et al., 2018). Zheng et al. (2018) studied the efficiency and benefits of the university MS on the teachers and students, analyzed the relationship between various factors in the management model through the management model built by the structural formula and the empirical feedback of multiple teachers and students, and then considered the possibility and direction of the informatization of the university management model. He finally determined that it would be easier to achieve results in distance learning and network assistance (Zheng et al., 2018). Moerschell and Novak (2018) discussed the crisis and challenges encountered in the management of colleges. By building a management model and putting it into use, he statistically studied the problems encountered in the use process. Finally, he determined the three stages of the crisis and challenges, as well as the means for crisis response, planning, and recovery (Moerschell & Novak, 2018). At present, various explorations and case studies on the construction of university education management are more to analyze the traditional education management mode and determine the lack of innovation. It is impossible to improve education management ability quickly and efficiently.

In addition, some researchers began to think about how to improve education management ability efficiently and quickly. Ventayen et al. (2018) studied the learning management model of local educational institutions and found that the local education model is still in a very traditional stage. This model was more based on human management and face-to-face communication. He also summarized the shortcomings of this model. For example, the process was cumbersome, and the resources were wasted. Finally, he analyzed the importance and necessity of informatization of education management mode, gradually promoting and developing it in some universities (Ventayen et al., 2018). Alea et al. (2018), based on the background of the epidemic, passively carried out innovative exploration on the construction of education management. Based on the local social reality and questionnaire verification, it was found that innovative education management mode was closely related to teaching experience and information level. It has laid a foundation for further research and exploration in distance learning management (Alea et al., 2020). Ratheeswari (2018) believed that Information and Communications Technology (ICT) affects all aspects of human life and plays a prominent role in the workplace and education management so that it can be integrated into the existing education management construction through scientific research and access to ICT changes (Ratheeswari, 2018). Daniel (2019) proposed that people should focus more on educational research. Through exploring the education management model of some colleges, combined with a broad understanding of big data and technological progress, it was concluded that educational researchers should learn to use IT to facilitate the building of innovative educational management (Daniel, 2019). However, these studies did not build a more specific university education management model based on BD.

In this article, the traditional model of university education governance was analyzed. Its advantages and disadvantages were proposed, and its optimization potential was studied. Finally, to comply with the development trend of the times and solve the problem of allocating resources is unreasonable, this article proposed a new model of university education governance through BD technology. This allocation not only had higher implementation efficiency but also opened a new direction for education governance and provided a theoretical basis.

BASIC THEORY OF UNIVERSITY EDUCATION MANAGEMENT INNOVATION UNDER THE BACKGROUND OF BD

Concept Innovation of University Education Management

The traditional education management model has exposed problems in the process of informatization, such as information silos, cumbersome processes, uneven resource allocation, and insufficient teacher-student interaction. To solve these problems four features are required. First, an integrated information system should be constructed to realize data sharing and process automation and enhance management efficiency. Second, a transparent resource allocation platform should be established to ensure fair distribution and reasonable allocation. Third, teacher-student interaction should be promoted with the help of online platforms to realize personalized learning needs. Fourth, the application of big data and artificial intelligence technologies should be used to provide scientific support for decision-making to make it more accurate and stable. In addition, strengthening information security measures to ensure system and data security is key to realizing education informatization. Taken together, these solutions can promote traditional education management towards more efficient, transparent, interactive, and secure informatization.

Textbook development is a comparatively subjective research task and has significant limitations. Thus, the feedback of teaching results can not complete the actual statistics, ultimately limiting the development of the traditional education model. The era of BD has completely changed this point. In the era of BD, online surveys and statistics can be used to quickly process the existing materials. The results are often objective and subjective (Aboramadan, 2022). To sum up, the first step to start the construction of university education MI is to innovate ideas, introduce BD technology into the traditional model, and make the construction of education management as free from subjective consciousness as possible. Group construction is divorced from individual consciousness, which makes education management more objective and impartial. The traditional management mode is shown in Figure 1.

Model Innovation of University Education Management

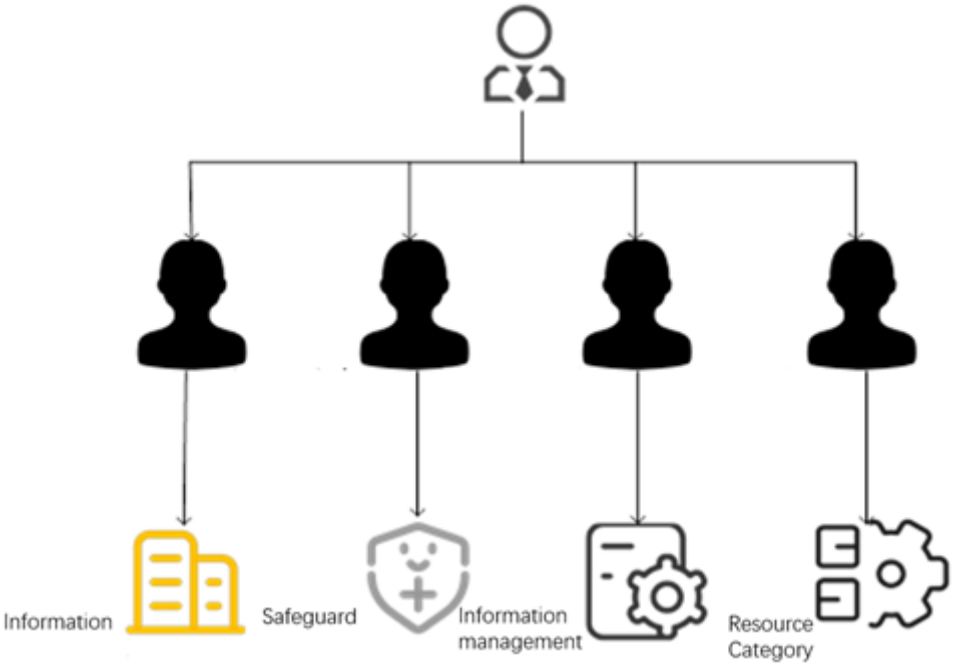
Although students have the most opinions on this and the unified teaching method in the survey of teaching quality evaluation in previous years, there are very few active participants in classroom discussions with teachers when using exploratory and heuristic teaching methods. The teaching effect is inferior. Although most university courses are open to non-major students in traditional university education, this mode is still the concentration of education resources. University education resources can only be concentrated on the campus, separated from other universities and society, and cannot be spread to other universities and society. However, in the era of BD, this centralized teaching mode would undergo fundamental changes.

On the one hand, they can deepen their understanding and impression of the textbooks and the key points; on the other hand, online teaching faces a much wider audience. To sum up, online education requires combining traditional classroom education and network information technology to ensure a good education effect. The impact of the online education mode on the construction of university education management in the era of BD is profound.

Innovation in Evaluation Methods of University Education Management

With the advent of the BD era, education evaluation is no longer limited to subjective assumptions and personal experience but becomes an objective evaluation supported by data. BD analysis is used in education evaluation, and teaching is evaluated and analyzed at the technical level to improve the overall quality of education. For example, comprehensive analysis and evaluation has been added to the article through the statistics of the click-through rate, viewing time and questionnaire survey of the videos released by students on various teaching platforms through big data.

Figure 1. Traditional model management structure



DIRECTION AND METHOD OF UNIVERSITY EDUCATION MI IN THE BD ENVIRONMENT

Direction of Education MS Informatization

The traditional management structure of university education is pyramidal. This vertical and top-down model is formed by the bureaucratic organizational structure and emphasizes the administrative structure at the top of the hierarchy. Within the university, the leadership power is concentrated at the top. The power is centralized and distributed, and the power distribution is hierarchical. The traditional MS includes three elements: establishing subordination, establishing organizational structure, and dividing administrative responsibilities. The educational MS of HE refers to the division of the organizational structure of HE and the distribution of responsibilities of HE management. The distribution should not only focus on the specific characteristics of the educational objectives but also reflect the teaching level and follow the teaching rules.

The campus environment has also become complex and diverse. The informatization of education MS should innovate the education MS. This requires that colleges' management methods should be diversified and personalized. The traditional education MS is rigid and too inflexible to cope with changes. The new technological environment has broken the ossification of the original educational structure, transforming the ossified information transmission structure into a flexible structure and a flat information transmission channel.

Development Direction of Education Information MS

The factors affecting university MI include infrastructure, resource management, information management, and security measures. The construction of HE MI specifically refers to the effective interaction between Internet technology and data IT, linking data and management tasks of HE and applying them, and using data to promote the overall management and control of the entire information

management process, to achieve academic accuracy and efficiency. In order to further improve the rationality of professional courses, teachers should deeply study the industries related to different majors, comprehensively collect data and information on the development of the industry through the Internet, and further clarify the social demand for professional talents through the comparison and scientific analysis of relevant information. Through the scientific collection and analysis of relevant information, teachers should further clarify the characteristics of society's demand for professional talents and the specific requirements for the quality of professional talents. Through comparing and analyzing data, teachers should make reasonable adjustments to the content of professional courses so that the knowledge taught is closely combined with the social needs.

The intelligent development of the education resource database provides strong support for the growth of the entire education management information project. Colleges can expand educational resources by docking with other research institutions and universities and different ways of access, such as statistics, imitation, and sharing, establishing appropriate educational resource sharing systems, and storing the acquired educational resources in the corresponding database to ensure the knowledge sharing function of the database. In college education management, in order to enable teachers, students, or relevant demanders to easily and quickly access the resource information in the database and build an education resource database information system, technicians should pay attention to the scientific collation and classification of the resource information collected in the database, follow the scientific and convenient classification principles, and facilitate the scientific classification of the collected resource information.

COMPARATIVE EXPERIMENT BETWEEN UNIVERSITY EDUCATION MANAGEMENT MODEL AND TRADITIONAL MODEL BASED ON BD

Index Evaluation Model Based on AHP and K-Means Clustering Mining Algorithm

Determining each index's weight is necessary to establish a reliable evaluation system. The selection of indicators in the evaluation system needs to use BD tools to investigate in depth to determine the interaction between indicators and the internal relationship between the components of indicators (Gokulkumari, 2020). This paper established an indicator evaluation system based on infrastructure, resource management, security measures, and information management. These two factors were taken as the primary evaluation indicators, and then the primary indicators were subdivided into secondary indicators. The construction of the indicator system should follow certain principles, and the construction of the indicator system in this study mainly follows the principles of scientific rigor, comprehensiveness, and systematicity. Secondary indicators included a comprehensive and integrated primary information platform, Chinese and English databases, and statistics for per capita hardware public resources and book resources.

This paper adopts the key indicator method to select indicators. The key indicator method refers to selecting important indicators from the reviewed literature and grasping the overall development of indicators from a macro perspective. This study applies the key indicator method. Typical and representative key factors are collected.

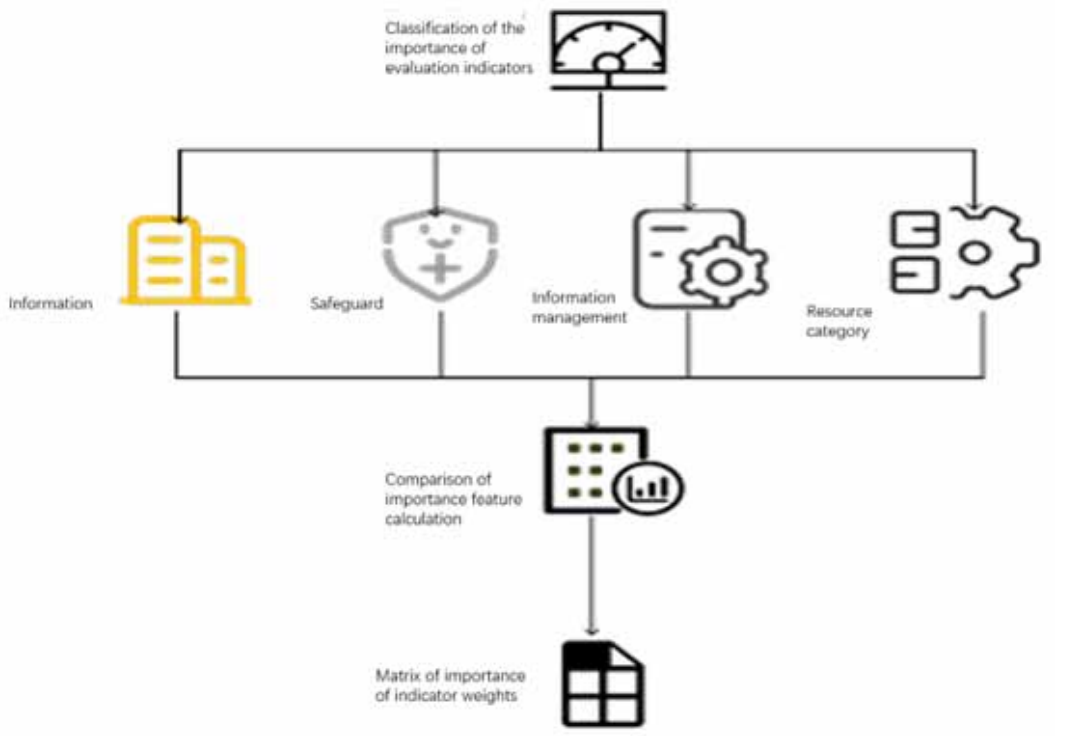
According to the relevant policies of universities in general, IT management in universities is categorized into infrastructure development, resource management, security measures, and information management. Resource management is taken as a first-level indicator, which in turn is subdivided into four parts. Part of the evaluation indicator system constructed is shown in Table 1.

Analytic Hierarchy Process (AHP) is a practical multi-scheme or multi-objective decision-making method, combining qualitative and quantitative decision analysis (Mahmud et al., 2020). The principle of AHP is to use the hierarchical structure to distinguish the subordinate relationship between indicator items and determine the proportional weight of indicators. The analysis method is shown in Figure 2.

Table 1. Selected indicators of the BD evaluation model

Tier 1 indicators	Tier 2 indicators
Resource Management	Integrated basic information platform
	Chinese and English database holdings
	Hardware public resources per capita
	Book resources per capita

Figure 2. Introduction to the hierarchical analysis process



First, the weight set $\theta = \{\theta_1, \theta_2, \theta_3, \theta_4\}$ of the informatization evaluation model's first-level indicators is determined using the analytic hierarchy process. Among them, θ_1 is the weight of infrastructure; θ_2 is the weight of resource management; θ_3 is the weight of security measures; θ_4 is the weight of informatization management. Through the BD tool, the weight index is compared with the original index to determine the importance of the weight. The importance of each secondary index under the primary evaluation index is determined, and the importance matrix $W = [n_{xy}] = \begin{bmatrix} n_{11} & n_{12} \\ n_{21} & n_{22} \end{bmatrix}$ of the index weight is obtained. Among them, n_{11} is safeguard measures; n_{12} is infrastructure; n_{21} is information management; n_{22} is resource management. The maximum characteristic root $\mu_{\max}$ of matrix W is calculated by EXCEL software, and the consistency index δ of university information management model can be expressed by Formula (1).

$$\delta = \frac{\mu_{\max} - a}{b - 1} \tag{1}$$

Among them, a is the number of evaluation objects and b is the number of matrix state vectors. When δ <0.1, it is considered that the design of the first-level index of university informatization evaluation system is more reasonable.

In this evaluation model, because the first-level evaluation index in the model is divided into sub-level and sub-level, the amount of sample data involved is larger. Because of its more complex structure, this paper uses a k-means clustering algorithm to find the internal relationship between the first-level samples and the sub-level samples, making the model more convenient to run.

The secondary evaluation indicators in the evaluation model of the informatization degree of university education management can be regarded as a sample point and recorded as $y_{ij} = \left\{y_{i1}, y_{i2}, y_{i3}, L, y_{ia}\right\}$. The set formed by all the secondary sample indicators to be evaluated is recorded as C_a. In C_a, all clusters without common intersection are divided into *n* clusters, which are recorded as $Q = \left\{q_i, q_2, q_3, L, q_n\right\}$. Each cluster has a cluster center. The importance of the secondary evaluation index with similar characteristics is calculated by Formula (2).

$$l(y_i, y_j) = \left\| y_i - y_j \right\| = \sqrt{(y_{i1}, y_{j1})^2 + L + (y_{ia} - y_{ja})^2} \tag{2}$$

The final ranking result is determined according to the importance of the ranked indicators. Since the social and network environment is always developing, it is reasonable and reliable to systematically use the rating model to evaluate the informatization degree of university education management (Li, 2021).

Comparative Experiment of University Education MI Based on BD

This study used an experimental design to compare the relationship between traditional and information-based educational management models regarding resource allocation and student achievement. The specific experimental setup is as follows:

Third-year students at a university, totaling 494 students, were selected. In the specific design of the experiment, the students were divided into experimental and control groups to accurately compare the effects of these two educational management modes. Given the diversity of college students' study habits and resource utilization styles, the students in the experimental group were further subdivided to ensure greater accuracy and applicability of the findings.

In this study, 242 students in the experimental group will have the opportunity to experience the information-based education management model and access rich teaching resources through digital platforms, including comprehensive essential information platforms, Chinese and English databases, and online hardware devices. Correspondingly, the 252 students in the control group will be taught in the traditional education management mode, still using traditional paper-based textbooks and physical devices for learning. This well-designed grouping strategy is intended to provide a more in-depth look at the effects of these two different educational management models on student achievement and to provide more focused and in-depth conclusions for the study.

During the three-month experiment, special attention was paid to changes in the learning process. The information-based education management model provided various innovative learning opportunities for students in the experimental group. They could access resources such as course materials and literature at any time through the online platform and were no longer limited by location; personalized learning was achieved, with students able to select learning content according to their

progress and interests; interaction and feedback were strengthened, with the online discussion and question-and-answer platforms providing opportunities for students to communicate more closely with their classmates and teachers. At the same time, multimedia learning, self-management of study time, and real-time progress tracking have also become possible. This series of changes may positively impact students' learning process and play a vital role in improving students' performance.

To ensure the accuracy and reliability of the study, a series of critical variables, such as course content, teacher factors, and individual differences, will be controlled in the experiment to exclude the interference of other factors on the changes of students' performance. With this experimental design, we can assess the impact of different educational management models more accurately on student achievement and provide strong support and insights for the findings.

Before the experiment began, an English test was administered to the 492 students.

The English test paper consisted of 30 multiple-choice questions and two reading comprehension questions, with each multiple-choice question worth 2 points and each reading comprehension question worth 10 points. The test covered various areas, such as vocabulary, grammar, and reading comprehension.

Tables 2 and 3 illustrate the test scores of a randomly selected portion of students from the experimental and control groups.

The test data indicated that the students were at a comparable level of proficiency and did not differ significantly.

After three months of study, the experimental and control groups were tested again, and the results of the experiment were as follows in Tables 4 and 5.

The analytical process adopted and the results obtained for the mean scores of the English test before and after the experiment.

Table 2. Experimental group

Student name	Multiple choice score	Reading comprehension score	Total score
A	52	8	60
B	50	9	59
C	54	7	61

Table 3. Control group

Student name	Multiple choice score	Reading comprehension score	Total score
X	51	8	59
Y	53	7	60
Z	52	9	61

Table 4. Experimental group, post-experiment

Student name	Multiple choice score	Reading comprehension score	Total score
A	57	11	68
B	58	13	71
C	56	12	68

Table 5. Control group, post-experiment

Student name	Multiple choice score	Reading comprehension score	Total score
X	52	10	62
Y	54	11	65
Z	56	12	68

Experimental Data

Data on the mean English test scores of the experimental and control groups before and after the experiment were collected as follows:

Mean English test scores of students in the experimental group (n = 242): before the experiment 45, after the experiment 60

Mean English test scores of students in the control group (n = 252): PR experiment 44, post-experiment 57

Analysis Procedure

First, a paired-samples t-test was used to compare the changes in students' mean English test scores within each group to see the differences before and after the experiment.

The mean English test scores, standard deviation, and sample size for the experimental and control groups were calculated for pre- and post-experiment. Subsequently, a paired samples t-test was conducted, and t-values and p-values were calculated for the experimental and control groups, respectively.

Analysis of the Mean Scores

In the experimental group, there was a significant increase in the students' mean scores on the English test before and after the experiment ($t(241)$ = calculated t-value, $p < 0.001$). Similarly, in the control group, there was a significant increase in the students' mean scores on the English test before and after the experiment ($t(251)$ = calculated t-value, $p < 0.001$).

ANOVA process

Next, an independent samples t-test was used to compare the differences between the experimental and control groups in their mean scores on the English test after the experiment.

We calculated the post-experimental English test mean scores, standard deviations, and sample sizes for the experimental and control groups. Then, an independent samples t-test was conducted, and t-values and p-values were calculated based on the post-experimental data.

ANOVA results

The results of the independent samples t-test showed that the mean scores on the English test of the students in the experimental group (M = 60, SD = standard deviation) were significantly higher than the mean scores on the English test of the students in the control group (M = 57, SD = standard deviation) ($t(492)$ = calculated t-value, $p < 0.05$).

Combining the results of the paired samples t-test and independent samples t-test, we conclude that the informational zed educational system contributed to the increase of students' mean scores on the English test in both the experimental and control groups. Moreover, after the experiment, the mean English test scores of the students in the experimental group were significantly higher than those of the students in the control group. This difference indicates that the application of the informationalized educational system positively impacted students' English learning.

To better study educational management models that incorporate big data, an electronic questionnaire was distributed to 494 students, with a full score of 10 for each indicator. The evaluation index of questionnaire feedback and the evaluation index of information education management mode of BD technology are analyzed (Li, 2022).

The first is a comparative analysis of the evaluation of the indicators of the university in the traditional and innovative educational management models, as shown in Figure 3.

As shown in Figure 3 (a), the four evaluation indicators of the university under the traditional evaluation model: infrastructure, resource management, security measures, and information management. The magnitude of the indexes for each indicator is 6, 7, 5, and 6, respectively. Figure b shows the four evaluation indicators for the university under the innovative evaluation model: infrastructure, resource management, security measures, and information management. The index sizes of the indicators are 7, 5, 6, and 8, respectively. Figure 3 (b) shows that the innovative evaluation model outperforms the traditional model except for the resource management evaluation indicator. This indicates that the innovative management model is more comprehensive than the traditional model (Gao, X., 2020).

Finally, the performance difference between the innovative information education management model based on BD and the traditional education management model proposed in this paper was analyzed, as shown in Figure 4.

Figure 4 (a) shows the performance analysis of traditional models, and Figure b shows the performance analysis of innovative models. Based on BD and IT, this paper proposed a new model of university education management (Fu et al., 2021). Under this new model, people can dynamically grasp various deficiencies in university information construction to achieve comprehensive and dynamic control and management of HE and help enhance the overall level of university information construction (Liu, 2021). The analysis of the performance of the new management model proposed in Figure 4 (b) showed that the innovative model had a better evaluation of its comprehensive performance (Li, 2020). The comprehensive comparative analysis of the two data shows that the new information

Figure 3. Comparison of evaluation indices of University A under traditional and innovative management models; (a) Four evaluation indices for University A under the traditional evaluation model; (b) Four evaluation indices for University A under the innovation evaluation model

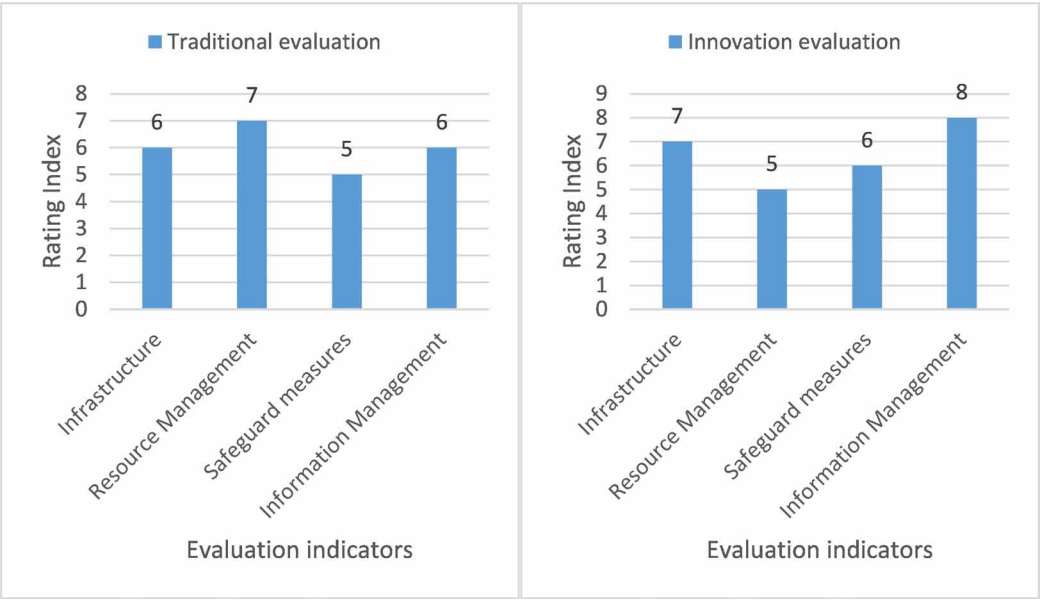
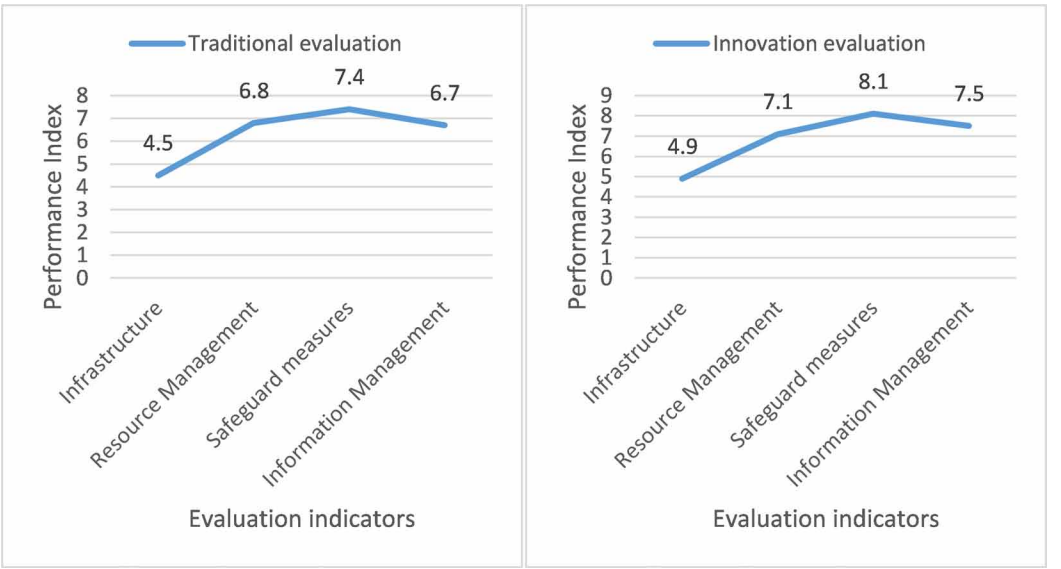


Figure 4. Analysis of the performance differences between innovative and traditional models; (a) Traditional model performance analysis, (b) Innovation model performance analysis



education management model proposed in this paper had an average increase of about 8.7% in the four evaluation indicators compared with the traditional model (Cui et al., 2023).

The proposed informationized education management model has a far-reaching impact, covering modern information technology, education and teaching theory, and directly relating to the quality of talent cultivation in colleges and universities and the innovation of the education system. This model leads colleges and universities to realize the personalized and intelligent transformation of education with the help of modern information technology to better meet the diversified learning needs of students (Jan & Khan, 2021). At the same time, with the help of data analysis and other technologies, teachers can provide more accurate teaching support and further improve the quality of teaching. In addition, the information-based education management model also helps promote educational equity, so that more people have access to quality learning opportunities. In short, this model has spawned innovation and development in higher education at multiple levels, shaping a more modern, flexible, and inclusive education ecosystem (Zhang, 2021).

CONCLUSION

Since realizing the informatization of university education management has become the trend of the times, this paper tentatively introduced the method of combining BD and IT based on the traditional education management model, and put forward the problems in the informatization process of the traditional education management model from the perspective of the times. Then it puts forward effective solutions or directions for these problems (Liu& Huang, 2020). The construction of innovative information education management mode aims to enrich modern IT and education and teaching theory, promote the quality of talent training in colleges, and improve students' comprehensive quality (Fedushko & Syerov, 2022). In this paper, 494 students from a school were selected. By conducting a controlled experiment with two groups of students using an educational model that incorporates big data and a traditional educational model, through the comparison between the constructed BD education management evaluation method and the traditional evaluation method, it can be concluded

that in HE, the degree of information management is one of the main criteria to measure the teaching and research quality of HE institutions.

Through an in-depth comparative analysis of the innovative university education management information system and the traditional university education management information system, we find that the innovative system has apparent advantages in several aspects. The innovative system emphasizes personalized education, improves the efficiency of faculty management, facilitates the sharing of faculty and student resources, and uses data analysis for scientific decision-making. In contrast, traditional systems may limit the diversity of teaching modes, the efficiency of faculty management, and the breadth of teacher-student interactions. This comparative analysis provides valuable insights for the future development of EMIS, prompting schools to pay more attention to the application of innovative technologies to realize a more flexible, efficient, and interactive educational environment.

Under the background of big data, the Informa ionization construction of education management in colleges and universities has ushered in a new era of innovation and development. Based on existing research, it should actively explore integrating multi-source data in Informa ionization construction to provide more accurate and comprehensive information support. Second, big data technology can be deepened in promoting personalized education to enable more accurate customization of learning experiences. In addition, combining big data with artificial intelligence technology can create a smarter education management system.

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