

New Era Research about the Quality of Digital Education Administration in Colleges and Institutions

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Abstract: With the continuous innovation and reform of the Internet and big data technology, various network means and management methods are gradually incorporated into the college's education, teaching, and management work to achieve network information management of students' teaching activities and daily activities. Moreover, through a series of related technical means such as big data technology and information technology, universities can comprehend current college students' living habits and thought patterns and continually explore the goals of operating a school that is more aligned with humanistic care and individualized care instruction. The information management and information system that relies on Internet big data technology can aid in the timely analysis of problems and shortcomings in the current college education and teaching management, maximize the level of student service and management efficiency, and promote the college's data-based education management model to be compatible with international standards. Keeping up with the times, continually enhancing the education management system, and sustaining the growth of college digital education management in the new era is essential to ensuring its continued success.

1. Introduction

The expansion of the digital economy is the sole means of achieving high-quality, consistent economic growth and constructing a modern economic system. Big data plays a particularly important role in the transition from the era of the industrial economy to the age of the big data economy to better promote the development, transformation, and upgrading of the digital economy. With big data resources as the fundamental element and a contemporary information network as the primary carrier, we can achieve the speedy and optimum allocation and regeneration of resources and foster the creation of new forms in the digital economy age. Big data simultaneously permeates all parts of social life with an irreversible trend, altering people's output and lifestyles. Nevertheless, the advancement of science and technology cannot occur without the backing of education. The advancement of science imposes new needs and problems on education and also has some effect on the traditional sector of education, resulting in a contradiction between the new and the old, the advanced and the backward, in education. The conflict between them finally necessitated the creation and growth of education. The growth of big data technologies will influence education's

evolution. As a social core institution, it holds an important place in the era of the information economy. In creating information, fostering talent, developing technology, and serving society, colleges and universities provide a tremendous amount of latent energy to the progression of the times and the growth of civilization.

In the context of big data, the university curriculum, teaching style, management mode, teaching material, and evaluation undergo significant innovation. Concurrently, this transformation is an inevitable future trend, so it can only adapt to the growth of the digital economy period and advance the reform of the digital education management mode of colleges and universities in the new era. The reform of data-based education management in colleges and universities is of great significance to the working method, teaching management mode, and the development of a new pattern of education and instruction, and also makes new advances in enhancing students' social practice ability learning interest, and teaching level.

2. Method

This paper primarily utilizes literature research, comparative analysis, and integrated quantitative and qualitative research methods.

2.1 Technique of literature research

As a new driving force for today's economic and social growth, big data has led to many new objects and ideas, such as cloud computing, the Internet of Things, and smart education.

This study provides a theoretical understanding of the key ideas and features of big data and higher education and a distinction between the relevant concepts and their linkages.

Simultaneously, a comprehensive understanding of the research status of data education management in universities in the new era, applied to the university education industry through the integration of philosophy of science and other disciplines, the management of data education in universities in the new era will be presented.

2.2 Comparative and analytical procedure

By comparing the traditional and modern university education management models, emphasize the significance, urgency, and superiority of digital education management, compare the benefits and drawbacks of digital education management's future development and establish the direction and path of digital education management.

Comparing the benefits and drawbacks can serve as a benchmark for the quality of data education management in Chinese colleges.

2.3 Combine quantitative analysis with qualitative analysis

The qualitative research data demonstrate the necessity of data education management in colleges and universities. The quantitative research data are used to analyze university education management's current situation and pain points to propose specific countermeasures for the data reform of university education management.

3. Results and Discussions

3.1 The necessity of data-based education management in universities in the new era

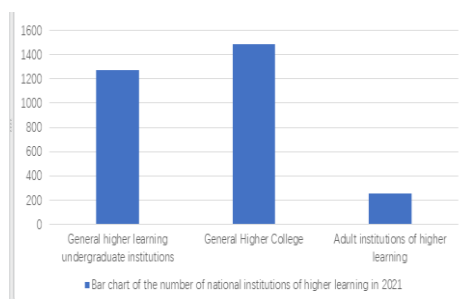


Figure 1: Bar chart of the number of national colleges and universities in 2021

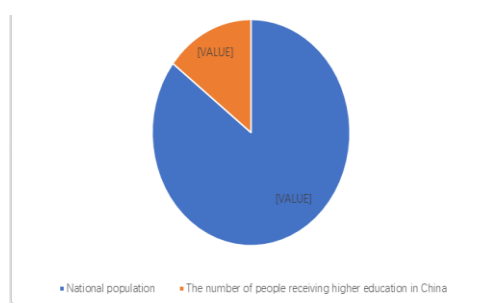


Figure 2: Map of national population and population receiving higher education in China

As shown in figure 1, according to the Education Bureau's 2021 National Institutions of Higher Learning List, there are 3,012 institutions of higher education, comprising 1,270 public undergraduate institutions, 1,486 junior colleges, and 256 higher education institutions for adults. In the "1 + 1" series of interviews on May 17, 2022, Wu Yan, head of the Higher Education Department of the Ministry of Education, stated that the number of persons getting higher education had reached 240 million, representing 17 per cent of the country's population, as shown in figure 2. These data demonstrate a large number of college students in our country, which unquestionably increases the difficulty and height of university management; university management presents an unprecedented challenge; however, the emergence of big data in the 21st century will inevitably bring unprecedented convenience to the higher education industry; the advent of the era of big data will inevitably usher in a new era of the new mode of digital management; it is also conducive to the promotion of the digital economy. In the modern world, big data permeates every area of human civilization, transforming not only the way of thinking, working, and living, but also the society's productivity and production relations. China's "implementation of the national big data policy" was unmistakably announced in 2015, following years of fermenting. The government must unite with businesses, universities, and research organizations, organize, and actively engage in order to tackle the difficulties of the "big data" era, and universities will undoubtedly be the participants and advocates of this big data tsunami. China offers unique circumstances for the study of big data in colleges and universities, and research and application of big data in education management are extensive, despite misunderstanding in the field of big data in education. Consequently, the data on education management in colleges and universities adheres to the unavoidable pattern of education growth in the modern period[1].

The data management of colleges and universities in the modern day is accelerating the modernization of education, assisting instructors in developing their vocational skills, and enhancing the standard of education and instruction. In the new era, university digital education

management has become a powerful support for the sustainable growth of the contemporary university education mode and encourages the development of university management and education in a way that benefits both. In addition to being a new strategic objective of higher education personnel training, the informatization growth of colleges and universities in the new age is at the forefront of the national education informatization reform as a whole. This digital education management mode conforms to the direction of the education system, is the education theory and new era of high-quality talent output, and universities in the new era should vigorously promote the digital education management concept, continuously improve the education system, the digital education management content and teaching methods for scientific and effective reform, and actively combine the construction of the modern economy and society to improve the quality of education. It offers a solid assurance for the modernization of colleges and universities in the new era that keeps up with The Times and continuously optimizes the education structure to support the efficient improvement of data education management in colleges and universities in the new era.

However, with the reform of modern university education, innovation, management mode optimization, and students' education management and teaching management of more and more involved in the data, in the long work accumulation, accumulated data is very large; therefore, in order to cater to the new era of the development goals of colleges and universities, university data management is necessary through a learning management system to collect students' learning situation, including grading and attendance. In the era of big data, decisions regarding the development of colleges and universities are now predicated on accurate data modules used to evaluate the students' learning situation, and managed in a standardized, scientific, and efficient manner. As a result, efficient teaching activities have become the top development priority. The cloud computing platform, with its large data storage, background computing, resource sharing, and other applications, offers institutions with technical assistance for enhancing management efficiency, realizing resource sharing, and extracting data value. In addition, the contemporary and effective ten-sentence education management module gives a new development path for the university education management reform that differs from the old teaching mode. Information construction of university education management in the new era has made advances in students' study, management efficiency in life, teaching quality of professional courses, and scientific and technological achievements of scientific research and innovation by relying on the digital information management mode. However, the ever-increasing size and complexity of data analysis also offers practical obstacles for higher education administration. With the fast expansion of structured and unstructured data, it is essential to develop a new cloud-based paradigm for education management information[2]. Following the rise of the Internet and cloud computing, big data represents the third disruptive technology revolution. The arrival of the era of big data is accelerating the modernization of education, assisting instructors in developing their vocational skills, and enhancing the standard of education and instruction. In this context, it is appropriate to use big data to the data-driven administration of higher education institutions.

3.2 The current condition and issues in college and university education administration

3.2.1 The development goals of colleges and universities do not match the management concept

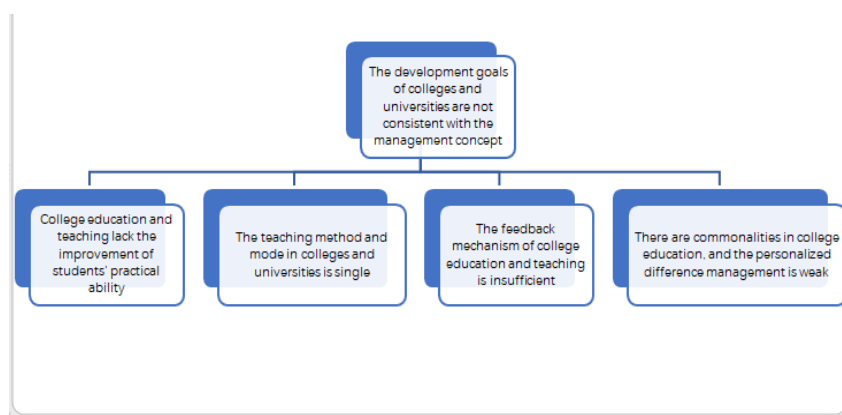


Figure 3: Analysis of the inconsistency between university development goals and management concepts

The education and teaching management mode of colleges and universities is now constrained by the conventional education management mode, which displays inflexible management and lacks flexibility in the management idea, management system, management content, and management technique. Traditional university education management has numerous flaws: the management organization as a static structure, excessive emphasis on management institutionalization, regularization, stereotypes, pattern, standardization, emphasize rigid management ignore flexible management, emphasize to obey and obey, and ignore the subjective initiative; these are incompatible with modern big data university education management, and are not conducive to the development of college students. As shown in figure 3, inconsistency between the development goals and management concepts of colleges and universities is most evident in the lack of improvement of students' practical ability in college teaching, the single mode of college teaching methods, the insufficient feedback mechanism of college education and teaching, and the commonality and weak management of personalized difference in college education. College education teaching lack of students' practice ability is primarily reflected in education teaching work that remains on the surface, the cultivation of students' practice, the students' education work's inability to timely update the teaching content, teaching process, and education outcomes; concurrently, subject content is not advancing with The Times, adapting to The Times' development; and students' lack of interest in course content. According to the current state of college education in our country, the majority of colleges and universities in education teaching use single traditional multimedia courseware teaching, stay in indoctrination education, students are given priority to listen, teaching material content with unified resources, and did not combine the actual situation of students with a detailed teaching plan. Because students are uninterested in the teaching material and because the typical class data collecting technique with the study committee as the major body provides a set cycle of inspection, assessment, and evaluation, long-term feedback is prevalent and immediate feedback is inadequate. Due to the delay in feedback, it is sometimes too late to rectify and compensate for poor performance, and the opportunity to remedy the problem is frequently missed. Population-based teachers are unable to provide students with one-to-one personalized teaching content due to the limitations of teachers' resources and school size's technical level. As a result, students receive the same treatment, use the same textbook set, maintain the same teaching progress, teaching and learning are based on a unified standard, and personalized difference

management is weak.

On the basis of the four inconsistencies between university growth goals and management conceptions, it can be concluded that the existing university education management mode does not fully realize the benefits of the data-based education management mode[3]. The teaching objective of the current college education model should always be to stay up with the times. The manner of instructional management should be adapted at every moment to the social development setting. Colleges and universities should use a scientific and effective education strategy in the planning of their own development, as well as engage in macro reform and innovation for the positioning and development of their distinctive majors. To transform the teaching management mode into the pursuit goal of The Times, colleges and universities should change their own education management reform mode in response to the changing environment of The Times and achieve the state-advocated goal of "striving for first-class universities and first-class majors."

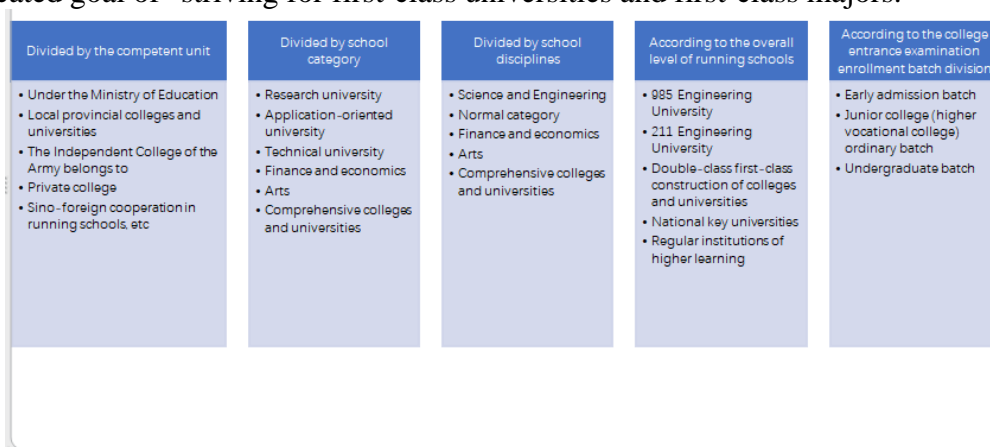


Figure 4: Type and division of colleges and universities in China

As shown in figure 4, different standards and unit entities can be used to classify the types of Chinese colleges shown in the graph. According to those mentioned above, five classifications are often split. For instance, the ordinary school-running level recognizable to the general public can be separated into "985 Project Universities" and "211 Project Universities", etc. These classification standards have not been quantified. There is no specific data index to scientifically and effectively classify Chinese universities; however, the classification of university types and the construction of first-class universities must rely on the "index system" to divide colleges and universities. In generating and finishing the "indicator standard system," data construction is a necessary hardware facility, and management techniques are based on "software" based on hardware facilities. Currently, several schools and institutions lack a genuine understanding of the phenomena of misalignment between development objectives and management paradigms, which results from the organic mixture of the two. Colleges and universities believe they are seeking reform and development, but they do not comprehend the meaning of innovation and do not implement the data management model for students' learning management. In addition, it lacks a professional understanding of data management and the support of necessary personnel and a vision of intelligent and information-based big data management in schools and universities. The aforementioned impedes the implementation of the teaching model of data management in contemporary colleges and universities from the standpoint of empirical research[4].

Figure according to different standards and unit subject can be divided into the types of colleges and universities in China, typically based on the above five classifications, such as the overall level can be divided into "985 engineering universities""211 engineering universities" and so on. However, it is evident that these criteria are not quantifiable, and there are no specific data

indicators to scientific and effective division of universities in China. The classification of colleges and universities and the development of elite universities must be based on the "index system." The data construction is an essential hardware facility in the establishment and completion of the "index system" of colleges and universities, whereas the management methods are "software" based on the hardware facilities. Currently, many colleges and universities are not real combination of the two, development goals and management mode, the pursuit of reform and development of colleges and universities, no real understanding of innovation, no real data management mode to students' learning management, but also the lack of professional data management professional ideas and related talents, lack of intelligent, information big data management vision, through practical research, the aforementioned issues are being addressed.

3.2.2 Conflicting aspects of humanized management and data management in higher education

Traditional college education management mode is determined by the subjective consciousness of many managers, the campus management system is by managers of all levels of working experience setting rules system, and expanding the scope of management at the same time, will also violate the reasonable rights and interests of students to a certain extent. More crucially, students' general abilities cannot be enhanced in any manner, and there are "three deficiencies": a failure to keep up with the times, a lack of individualized understanding of students' education and instruction, and a lack of comprehension of the overall educational development trend. Curriculum standards, homework requirements, attendance rate, and dormitory management, for example, do not fully respect students' actual needs, and future job growth and life demands do not fully address students' psychological needs. In the modern era, the management mode of colleges and universities should replace the conventional ineffective management mode with humanized innovation and reform. College students' interests in subjects, as well as their desire to safeguard their identities, should be considered sensibly[5]. Contemporary college students' behavior and ideological style may be utilized as a guide for decision-making, humanized management, and scientific prediction and decision-making. Simultaneously, the actual demands of instructors and pupils must be positioned on the discipline practice, and precise management must be implemented. Adopt and promote big data technologies to assist schools in transitioning to a data-driven management approach for education.

For meeting the needs of teachers and students, the traditional college education management mode of college education and teaching must be completely replaced with innovative, interesting, and insufficient systematic disconnection from The Times, practice, other education fields, and students' personalized development. Every university education project should be based on big data, with the goal of gradually establishing big data thinking consciousness, making scientific and reasonable decisions based on data analysis, realizing democratic, scientific, and efficient data management, and promoting educational and teaching reform. The decision to change the teaching management mode is based on years of school management experience and the single subject of student cadres and instructors in the conventional teaching scenario design and teaching information gathering. However, in the building of a large data management system, teaching experience and management systems of colleges and universities are no longer the dominating aspects of teaching, and collecting students' opinion data will also be a major influencing factor in data teaching management. The best teaching reform plan is obtained through analysis and integration, in order to use real and effective data analysis to make decisions, to assist universities in continuing to carry out teaching activities, and to achieve the goal of teaching students according to their aptitude and providing people-oriented education[6].

3.3 Specific reform measures for university data management

3.3.1 Using big data information technology, establish a comprehensive multi-multi-angle education management system and mechanism

The current university education management application of big data is weak; however, based on big data information technology, do the university education work "comprehensive-multi-angle-process-multidimensional" education management system, namely, fully understand the students and teachers' grasp of classroom teaching content with the help of big data information technology, and to use big data to the school departments for other teaching support and management, through Students' information and dynamics are precisely grasped by a systematic education management system and mechanism, which can effectively carry out the actual situation of students. With the introduction of big data, the era will, on the one hand, improve the speed of information acquisition, grasp the basic dynamics of students and retain electronic network traces for the first time, compensate for the lack of teachers' use of traditional collection forms and student cadre feedback, and reduce the time cost and complexity of collecting data information; on the other hand, big data can cover student behavior during school and conduct educative research.

3.3.2 Establish a feedback mechanism for the whole management of university education

Students no longer rely on traditional feedback, but rather on big data network media feedback, data resources timeliness, efficient mining and analysis to improve the management of pertinence and timeliness. Through the big data platform, students can obtain dynamic and basic data and analysis in real time, and the data can more clearly reflect the students' thoughts, behavior habits, and interests. Change the prior college education and teaching's poor feedback system and feedback latency. A university, for example, can gather student ideas for the course as well as reading status data for the course content. So teachers can focus on the students' preferences for which course, as well as the course content, feeling, and mastery, different students of different knowledge, different learning, and different reactions, to determine the teaching need to emphasize the form of knowledge and teaching, and can also be through timely feedback. Suggestions for improving course content increase students' interest for the material being taught. Students will be pushed relevant interested courses and often sought learning content by the mutual tradition of information and the network memory of big data to satisfy their individual learning demands. And, using big data analysis, it can be anticipated what plan should be followed to increase students' overall practical competence, as well as what teaching techniques and feedback mechanisms should be used.

3.3.3 Contemplating a move from traditional college administration mode to data management mode

The update of information technology is unpredictable, and its coverage, radiance, replacement speed, and processing power cannot be regulated, yet it strives for continuous progress. The informatization of college and university education administration closely parallels the network expansion process[7]. In addition to describing the educational construction objectives, it ensures management effectiveness.

There are stricter criteria for the quality and timeliness of information transmission, and the key departments involved in the administration of colleges and universities are becoming increasingly complex. In particular, the management of education at colleges and universities spans a huge territory and involves a broad breadth. The interaction between students, professors, administrators,

and off-campus employment raises the coordination requirements for management effectiveness and costs. In addition, the income and expenditures of people, resources, money, and time establish the management's effectiveness and growth potential.

By reintegrating the work of the institution's multiple departments, the university's informatization construction has substantially boosted the operational efficiency of the campus. For instance, admission procedures for first-year students at colleges and universities were tough in the past, and the related management offices, such as the Academic Affairs Office, the Logistics Office, and the Finance Office, were spread, making it difficult for first-year students to enrol. However, the current informatization infrastructure allows students to manage informatization from enrollment to graduation.

3.3.4 The organic confluence of network technology and digital education administration in universities and colleges

With the continuous improvement of the construction of the data-based teaching management model in colleges and universities, and following the characteristics of Internet big data information technology, online teaching, cloud sharing, information sharing, teaching management in the campus network environment, and the advancement of data statistics research technology are occurring. The relevance will expand, and security issues are linked to online training by teachers[8]. To prevent the leakage of personally identifiable information, schools should increase network security quickly and completely. The school should assemble a professional data-based information management and detection team to perform real-time monitoring of the school's information network, apply advanced intrusion monitoring technologies, and intelligently assess system vulnerabilities. Network security construction is intended to ensure the safety of digital services. Software with high-risk vulnerabilities requires maintenance. The school's teachers' and students' information is stored on the campus network server. Strengthening network architecture focuses mostly on server security management, and servers must be set with the correct access and replication privileges. Enhance the construction of the network management team, the monitoring of the networks of managers, and the professional skills of maintenance personnel and managers.

3.3.5 Establishing a professional, high-quality, data-driven teacher management team

As the central component of the design process for the digital education management platform in colleges and universities, teachers must gradually increase their knowledge of the application and management of big data and provide consistent support for the optimization and analysis of data resources. In college and university faculty formation, the team structure is frequently divided into two categories: professional teaching teams engaged in teaching and research and technology talents engaged in big data research. College and university teachers must include big data thinking into their teaching and scientific research teams to optimize talent teams in the current era of big data[9]. Therefore, teachers may improve themselves by incorporating the concept of data resource management into their daily work. Operational awareness facilitates a successful informatization transition. In the context of big data improvement, colleges and universities must also encourage professional instructors to participate actively in teaching reform and practice. In addition, colleges and universities must focus on the cultivation of big data professionals, expand the development channels of data research and technical talents through cooperation and exchanges with various enterprises, deliver professional talents to the country, and promote their core mission, which is to cultivate big data resource application technical talents.

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