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Research on Strategies for Universities to Optimize Educational Management and Improve Talent Training Quality and Efficiency Based on Big Data

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Abstract: With the continuous development of science and technology, China has gradually entered the era of big data. Universities have also adapted to the changes of the times to optimize and innovate educational management work. Aiming at improving the quality and efficiency of university talent training, this paper explores the practical paths for universities to use big data to optimize educational management. First, it analyzes the value dimensions of big data empowering university educational management; second, it examines the current practical dilemmas of universities in data governance, technology application, talent reserve, etc.; finally, it puts forward specific strategies from four aspects: constructing a data governance system, optimizing the teaching management model, carrying out precise student services, and improving the decision support mechanism. It aims to provide a useful reference for universities to realize the upgrading of educational management relying on big data and cultivate advantageous talents adapting to the development of the digital economy.

Keywords: Universities; Big data; Educational management; Talent training; Quality and efficiency improvement

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1. Introduction

With the development of information technology, big data has become an important force driving changes in the field of education. The “Opinions on Accelerating the Digitization of Education” jointly issued by the Ministry of Education and eight other departments clearly proposes to promote the integrated governance of educational data and facilitate artificial intelligence to assist educational reform. To cope with the arrival of the big data era, universities need to carry out a series of innovative attempts in student management models, innovate management concepts, and use big data to realize the scientificization, precision, and intelligence of educational management, optimize the learning environment for students, and promote their all-round development.

2. Value dimensions of big data empowering university educational management

2.1. Reconstruct teaching logic and promote precise talent training

The traditional educational management model has unified processes and rules, which is difficult to meet the needs of students' personalized development. Entering the era of big data, it is possible to collect students' learning and living data, analyze and summarize valuable data among them, and make scientific decisions in combination with the actual situation of universities [1]. In this context, educational management no longer needs to be limited to the subjective judgments and management experience of experts or managers, but makes more democratic, scientific, and flexible decisions based on objective data and actual conditions. For teachers, they can analyze students' learning situations by collecting massive data, formulate personalized educational plans for students, and realize precise teaching.

2.2. Optimize management processes and improve service efficiency

By building an integrated data sharing platform with big data technology, universities can break the information barriers between different departments and collect and manage data from links such as enrollment, student status, academic affairs, and employment. In academic management, analyzing students' course selection data and teachers' teaching evaluation can more accurately adjust curriculum settings and optimize teacher allocation; in employment services, integrating students' professional ability data with enterprise recruitment demand information can predict the employment trends of various majors and provide more targeted employment guidance for students [2]. The effective integration of data makes educational management services more efficient. While simplifying work processes and reducing repetitive work, it can also provide stronger support for students' growth and effectively improve their learning quality.

2.3. Support scientific decision-making and strengthen strategic guidance

University development decisions need comprehensive and objective data as support. Big data technology can integrate various data in the process of university operation, such as teaching quality data, scientific research achievement data, and resource allocation data. Through data modeling and visual analysis, it can provide a scientific basis for the university's discipline construction, professional layout, and revision of talent training programs [3]. For example, universities can collect employment data of graduates, integrate and analyze it, and adjust the current professional structure according to the needs of regional digital economic development, add emerging majors such as artificial intelligence and data science, and cultivate talents that meet the needs of the times.

3. Practical dilemmas of universities in optimizing educational management based on big data

3.1. Imperfect data governance system and weak foundation support

The use of big data in educational management will naturally involve data governance issues. At present, some universities are facing problems such as inconsistent data standards, uneven data quality, and difficulty in ensuring data security [4]. The reasons are as follows: first, each management system is developed by different manufacturers, with differences in data formats and coding rules, making data interoperability difficult; second, the quality of collected data varies, with problems such as duplicate, missing, and incorrect data, which affect the application effect of data; third, the awareness of protecting students' private data is insufficient, and there is a

risk of data leakage. Balancing data privacy and data freedom is a key factor affecting educational management.

3.2. Insufficient depth of technology application and unhighlighted integration efficiency

Universities can recognize the importance of big data for educational management, but how to apply big data in actual educational management and then innovate the traditional educational management model is a problem faced by most schools currently. The problem lies in that teaching management, it mainly focuses on data statistics and simple analysis, and fails to monitor and intervene in the teaching process through data mining and analysis [5]. In student management, data is mainly applied at the basic level of checking students' attendance and reward and punishment measures, and fails to build personal growth portraits for students. Managers lack awareness of big data applications, and the application of data in the management process remains superficial and fails to be implemented in management work, so it is naturally difficult to improve management efficiency.

3.3. Shortage of compound talents and insufficient professional support capacity

The application of big data naturally requires universities to provide professional management talents who not only have educational management capabilities but also master data collection, analysis, and application capabilities. At present, most of the personnel engaged in educational management in universities have traditional management backgrounds and lack professional data science knowledge and skills [6]. At the same time, talents in data science are mostly concentrated in the fields of scientific research and teaching, and few are involved in educational management. Universities' educational management is short of compound talents, and it is necessary to continuously cultivate and attract excellent teachers and managers to cope with the challenges of educational management.

3.4. Inadequate institutional guarantee mechanism and unformed application ecosystem

To give full play to the practical value of big data, universities should improve institutional guarantees and build a good educational ecosystem for the application of big data. However, at present, most universities have not established a systematic and perfect data management system, lacking unified standards for big data collection scope, sharing authority, usage specifications, and responsibility division. Each department manages data independently, making data interoperability and sharing difficult [7]. At the same time, the standardized application of big data in educational management is still in the initial exploration stage, lacking unified technical interfaces, data formats, and operating procedures. There are technical barriers to data interoperability across departments and systems, which affect the value of big data technology in educational management.

4. Core strategies for universities to optimize educational management based on big data

The purpose of universities using big data to optimize educational management is to solve the problems in the traditional management model through data-driven approaches and improve the precision and effectiveness of talent training. Combining the characteristics of big data technology and the laws of university educational management, focusing on the whole process of talent training, a strategic system is constructed from five dimensions: concept innovation, technical support, optimization of teaching management processes, innovation of student services, and long-term guarantee to optimize educational management and then improve the quality and efficiency of talent training.

4.1. Establish a data-driven concept and lay a solid foundation for management thought

First of all, universities should innovate at the ideological level, break the traditional empiricist thinking, and build a management cognitive system empowered by data. Therefore, university management should set an example, take the lead in promoting the popularization of big data concepts, carry out relevant special training, academic seminars, case sharing and other activities, convey the ideological concept of speaking with data, making decisions with data, and managing with data to all faculty and staff, clarify the value of big data in optimizing teaching processes, accurately serving students, and scientifically allocating resources, and eliminate the resistance of managers.

In addition, it is necessary to establish a people-oriented data application orientation, emphasize the essential purpose of data serving talent training, and not make conclusions based solely on data. In the process of data collection and application, it is necessary to collect data comprehensively, explore students' learning rules and growth needs through integrating a large amount of data, and pay attention to the cultivation of emotional care and humanistic literacy. At the same time, it is necessary to strengthen the awareness of data security and privacy protection, use data safely and in compliance, and guide managers to collect, store, and use data standardizedly [8].

4.2. Construct an integrated data system and strengthen management technical support

First, establish a unified data standard and sharing platform. With reference to national educational data standard specifications, integrate scattered data from various systems such as academic affairs, students, scientific research, and assets, unify formats, codes, and collection standards, and clarify the list of departmental data responsibilities. Build an integrated data management platform to centrally integrate data from the entire chain of enrollment, teaching, internship, and employment, realize data interoperability between departments, and provide data support for the whole-process management of talent training [9].

Second, strengthen data quality control and build a full-process system of "collection-cleaning-verification-update". Automatically collect data through multiple channels such as intelligent terminals and sensors to reduce errors caused by manual collection. Use algorithms to remove duplicate and incorrect data to improve data purity. At the same time, establish a quality evaluation index system, conduct regular audits and incorporate them into departmental assessments to ensure data accuracy and availability.

Third, build a solid data security barrier, formulate hierarchical and classified management methods, encrypt sensitive data, and clarify access rights and usage specifications. Use technologies such as data desensitization and log auditing to strengthen the whole-life cycle management and prevent data leakage, tampering and other incidents [10]. Establish an emergency response mechanism and conduct regular safety drills to make rapid responses when problems occur.

4.3. Optimize teaching management processes and improve the precision of talent training

Teaching management is the core link of talent training, and it is necessary to use big data to make the management process more refined and personalized. Universities can create a precise teaching model, collect and analyze students' classroom interaction, homework quality, online learning time and other data, build students' personal learning portraits, and clarify students' weak points and interest preferences. Implement differentiated teaching strategies based on portraits, push personalized resources and tutoring plans for individual students, divide learning groups for different needs, design targeted teaching content, and tailor teaching to students in accordance with their aptitude [11]. At the same time, collect teaching process data in real time and adjust teaching rhythm and methods accordingly.

Use big data to analyze industry development trends, market talent demand, and graduates' employment feedback, grasp social demand for talents, and optimize talent training programs. Combine disciplinary characteristics and faculty advantages, adjust professional settings and curriculum systems, add emerging interdisciplinary courses, strengthen practical teaching links, and increase the proportion of school-enterprise cooperation courses and on-the-job internships [12].

4.4. Innovate student management models and promote all-round development

Student management needs to transform to refinement, relying on big data. Universities can build a comprehensive student growth monitoring system, integrate multiple information such as student status, learning, life, psychological evaluation, and social practice, and establish dynamically updated growth portraits. Analyze portrait data through algorithm models to timely identify early warning signals such as academic decline, abnormal consumption, and abnormal psychological indicators, and launch a joint assistance mechanism involving counselors, professional teachers, and psychological counselors to detect, intervene, and assist students in solving problems in study and life at an early stage.

Based on growth portraits and career interest data, provide students with customized academic planning and career guidance. Recommend suitable professional directions, elective courses, and scientific research projects to guide students to clarify learning goals; integrate enterprise recruitment and industry trend data, push matching job information, and carry out personalized services such as resume optimization and interview coaching to improve employment competitiveness [13].

4.5. Improve faculty and institutional guarantees and lay a foundation for long-term development

To optimize higher education management, universities can build a professional team of educational management talents through multiple paths. Internally, build learning and exchange platforms for managers, provide targeted training resources to help them improve their data application capabilities, and consolidate the professional quality of the educational management team; at the same time, take data application level as an important reference for managers' career development, guide everyone to take the initiative to learn big data application technologies and management knowledge, and form a positive learning atmosphere [14].

Externally, absorb professional talents with expertise in data processing and intelligent technology, invite senior enterprise practitioners to participate in guidance work, and bring cutting-edge practical experience from the industry. Establish a collaborative team composed of personnel in fields such as educational management, data application, and subject teaching, and gather wisdom from multiple parties to promote the implementation of big data in educational management [15].

In terms of system construction, universities need to issue relevant regulations on data use, safety protection, and application standards, and clarify the responsibility boundaries of all participants in the whole data process. Incorporate the actual effect of big data application into the work evaluation system of departments and individuals, and affirm outstanding collectives and individuals; at the same time, deepen school-enterprise cooperation, build industry-university-research collaborative platforms with enterprises, and promote the development of specific work such as data platform construction and practical curriculum design, so as to provide practical guarantee for big data to empower educational management.

5. Conclusion

Educational digitization has brought historic opportunities for university educational reform, and big data technology has become an innovative force driving the transformation and development of university educational management. Universities should integrate big data technology into the educational management process, optimize educational management work according to the school's characteristics and students' actual conditions, promote the transformation of educational management towards a more intelligent, personalized, and scientific direction, and provide more possibilities for the development of higher education.

Disclosure statement

The author declares no conflict of interest.

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