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Analysis of Data Asset Management in Colleges and Universities

Hongfei Ding*, Yiqi Liu, Mengqi Xu, Qihong Lei

Finance Department, Wuhan University, Wuhan, Hubei, 430072, China

Corresponding author: Hongfei Ding, dinghongfei@126.com

Abstract: In the digital age, educational resources have become an important part of higher education institutions (HEI), and have improved teaching quality, scientific research output and administrative efficiency. Effective data asset management can greatly improve the decision-making process and resource allocation of higher education institutions. This study discusses the current situation of data asset management in higher education institutions, analyzes the challenges faced by data asset management, and puts forward strategies to improve data asset management. By analyzing some successful cases and drawing lessons from recent research experience, this paper aims to provide useful guidance for higher education institutions to make full use of their data assets and realize sustainable development in the digital age.

Keywords: Data Asset Management; Digital Transformation; Data Assets

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1.Introduction

The digital transformation sweeping across the field of education has completely changed the operation mode of higher education institutions. With the continuous emergence of information systems and digital tools, higher education institutions began to generate and collect massive data from various channels such as teaching activities, scientific research projects, administrative operations and student services. Keeping these data properly can bring many benefits to higher education institutions, such as improving teaching quality, choosing resources more wisely and enhancing research ability. However, many higher education institutions have many problems in properly managing their data assets. According to the research, efficient use of data resources can improve operational efficiency by 25% and teaching quality by 30%. This shows that the management of data assets is very important for the overall development of higher education institutions. With the continuous development of higher education institutions in the digital world, more and more information will be generated every day, so it is necessary to establish a powerful data asset management method.

2.The concept and characteristics of data assets of higher education institutions

The data assets of higher education institutions refer to all data-related resources owned or controlled by institutions, which can produce economic and academic benefits. These data assets are different because they come from different fields and have different forms; They are time-sensitive-their value will change over time; They are non-exhaustible-this means that they will not be exhausted when used, so we can use them repeatedly [1]. A firm grasp of all these characteristics is essential for effective data management. There are many kinds of data assets in higher education institutions, from students' enrollment

records and academic achievements (such data are organized in an orderly manner), research papers, class notes to multimedia content (such data are organized in an orderly manner). Diversity will bring many problems when storing, processing and viewing data. Take a simple example: structured data is easy to be stored in relational databases and analyzed by traditional data analysis tools, but unstructured data needs more advanced technologies, such as natural language processing and machine learning algorithms. According to the research, effective data asset management needs to use advanced data integration technology and create a unified data governance framework to manage complex data assets. Build a data lake that can handle all kinds of data and different formats, and adopt a data directory system, so that people can find and use data more easily [2].

3.Current situation of data asset management in colleges and universities

Many colleges and universities have made some progress in data asset management by building data management systems, adopting data warehouses, data mining and other technologies. But there are also some obstacles. Data may be scattered in different departments, so it will be difficult to share and integrate: for example, the student information system may be in the charge of the academic affairs office, and the library management system may also be in the charge of the library department. This division prevents us from fully grasping the learning process and experience of students. Data quality problems, such as errors, omissions and duplicate data, occur from time to time. If the data is incorrect, there may be errors-distributing data according to the wrong number of applicants or students' achievements in certain subjects. In addition, the faculty's awareness of data asset management is still weak, and there is a lack of full-time data administrators. Insufficient data security and privacy protection mechanisms will lead to serious data leakage and data abuse [3].

Data ownership: The data ownership and use right of higher education institutions are uncertain, so there may be data competition and problems in data use [4]. Due to the cooperative research work of scholars, the ownership problem between higher education institutions has become more complicated. It is controversial to determine the ownership of research data generated by multi-agency teamwork. This also makes it difficult for people to share data, obey rules and use data properly. For example, when scholars from different universities cooperate to carry out projects with external funding, determining who owns the data collected during the project may lead to disputes, which may lead to the slow publication of research results and publications.

Data security and data protection: The increasing amount of data brings the risk of security loopholes and privacy violations. Higher education institutions need to protect sensitive information, such as personal information of students and research data of teachers. Recently, many well-known data leakage incidents show that even excellent security organizations may become targets [5]. With the integration of artificial intelligence and data asset management, it is expected to change the way higher education institutions analyze and utilize data. According to the research, artificial intelligence analysis can mine the hidden patterns and information in massive data sets, thus helping to make more accurate predictions and wise choices.

Data management technology and talent shortage: Data technologies such as big data, artificial intelligence and cloud computing are changing rapidly. In order to keep up with these changes, we need to constantly improve the data management system and hire talents who know how to use these new tools. Many institutions of higher education find it difficult to meet these standards. The shortage of data management talents is a big challenge to achieve good data asset management. According to the research, universities should increase investment in training data management experts and actively seek experts in this field. Universities should establish contact with technology companies so that their employees can get practical training opportunities and master the latest data management technology.

Valuation and accounting of data assets: the value of data assets to a company is difficult to determine and reflect in financial statements. Due to the lack of uniform valuation and accounting standards, the value of data assets is difficult to reflect in financial statements. Chen Jianjun and Zhang Jianjun (2019) suggested that universities should explore cooperation modes with professional accounting firms and research institutions, and formulate appropriate data asset valuation models and accounting methods according to their own conditions. One way is to evaluate the value of data assets according to their impact on revenue generation, cost reduction or operational efficiency.

4.Effective management of data assets in colleges and universities

Building a comprehensive data asset management system: Universities need to formulate clear data asset management policies, rules and standards to ensure that everyone strictly abides by them. Set up a data asset department and a data asset management team to coordinate the work of various departments. Wang Jianjun and Wang Jianjun (2016) suggested that universities should set up a data governance committee to be responsible for the entire data asset management process. Establish data ownership and responsibilities for the Committee, create a data dictionary to standardize data, and establish a data quality monitoring mechanism. The Data Governance Committee needs to hold regular meetings to check data management practices, solve new problems, and ensure that everyone abides by data policies and regulations. In addition, the Committee will become a single point of contact for all data query and support of the department.

Strengthen data quality management: adopt a perfect data quality monitoring and evaluation system to ensure the accuracy, integrity, consistency and timeliness of data. Make data quality improvement plan and gradually improve data quality. It is suggested that higher education institutions conduct regular data quality audits and provide data quality management training for employees. Data quality audit is carried out by sampling data from different locations and checking them according to good quality standards. The audit results need to be applied to determine which areas need to be improved and gradually advance [6].

Promote data integration and sharing: use data integration technology to break data islands, form a unified data sharing platform, and maximize the value of data. In sharing, it is necessary to adopt advanced data integration technologies, such as data virtualization and data federation, in order to realize seamless data sharing across departments. Data virtualization enables different departments to utilize and integrate data from various sources without moving or copying data, thus reducing storage, reducing costs and ensuring information consistency. By simulating the important part of mixed data, data union enables us to view the information from different systems in a unified way, so that people can conduct research across departments without making data errors.

It is very important to strengthen data security and privacy protection, strict data security strategies and technical means, and measures such as data encryption, access control, data backup and recovery. In addition to training employees in data security and privacy protection, we also need to raise people's awareness [7]. Higher education institutions adopt multi-layer security methods, including network security, data encryption and user authentication. Regularly conduct data security review and risk assessment to improve data security. Network security measures should include firewalls, intrusion detection systems and secure network protocols to prevent data transmission channels from being accessed by uninvited personnel. Data should be encrypted when moving and at rest to protect sensitive data from being read by people who should not access it. User authentication mechanism must enforce strong password policy, multi-factor authentication and role-based access control, so that only authorized personnel can access specific data assets according to their roles and responsibilities.

Training and introducing data management talents: In order to improve data management capabilities, universities need to invest in training programs for data management professionals and actively hire experts in the field of data management. It is suggested that colleges and universities cooperate with external training institutions and universities to formulate training programs for data managers. Offering generous salary and better job opportunities can attract talents and keep them. Universities can also create a career development path of data management for their employees, so that they can be promoted and get higher salaries, and become contributors to the management of university data assets. In addition, the establishment of data management community in the school can promote knowledge exchange and cooperation among data professionals and create an atmosphere of continuous learning and progress.

5.Case study of data asset management in higher education institutions

This paper discusses several higher education institutions that successfully manage data assets. For example, a data governance committee for data asset management was established, which clarified the ownership and responsibility of data and created a unified data dictionary. The organization uses big data analysis tools to explore students' learning behavior and provide them with personalized learning suggestions. This not only improves the quality of education, but also improves students' academic performance. The data mining model used in the case study examines many aspects of students' data, such as the amount of homework they have completed, their test scores and whether they have participated in extracurricular activ-

ities. Through these insights, school staff can find students who have difficulties in specific topics and try specific solutions, extra courses and intelligent learning tools.

6.The future development of data asset management in colleges and universities

Looking forward to the future, with the continuous development of emerging technologies such as artificial intelligence, blockchain and Internet of Things, the data asset management of colleges and universities will continue to innovate. These technologies will make data asset management more intelligent, safe and convenient. Colleges and universities will pay more attention to the in-depth application of big data assets, and promote the innovation of teaching methods, the leap-forward development of scientific research and the overall institutional development. At the same time, the cooperation between universities and external enterprises and scientific research institutions will continue to increase, which will promote mutual benefit and win-win results and promote the development of data asset management. With the development of artificial intelligence, colleges and universities are expected to change the way they analyze and use data. Davenport and Patil(2012) believe that artificial intelligence analysis technology can find patterns and ideas hidden in massive data, so as to make more reasonable predictions and choices. This is very important for predicting students' performance and recommending personalized learning paths. Artificial intelligence algorithm can analyze students' past performance data, find students with learning risks as early as possible, and take action as early as possible to ensure that more students can maintain their learning progress and graduate smoothly. Blockchain technology will greatly improve the security and integrity of data, and ensure the decentralization and tamper resistance of data transaction books. Blockchain can ensure the authenticity and repeatability of data, thus reducing the possibility of data fraud and tampering. For example, we use blockchain to protect students' academic credentials, which means that when employers or other universities want to verify whether students' educational background and degrees are true, they don't need any intermediaries. The Internet of Things will also enhance its role in data asset management and collect real-time data from campus infrastructure and learning environment itself. IoT sensors can check how many people are in the classroom, check the electricity consumption on campus, and know whether students use smart devices installed in buildings to attend classes. Real-time data can be analyzed to improve the efficiency of resource allocation, improve campus energy efficiency and provide students with a more interactive learning experience.

7.Conclusion

In the era of digital data, data asset management is very important for higher education institutions. Understand the status quo, solve problems and adopt effective data asset management methods. In this way, universities can make full use of all data resources, enhance their core competitiveness and achieve sustained success. Based on the experience of successful cases, this paper hopes to provide reference for universities to improve their data asset management ability, so as to better adapt to the new digital era. Effective data asset management can help universities make full use of all data resources, enhance core competitiveness and promote sustainable development in the process of digital transformation. Colleges and universities should actively respond to the challenges of data asset management, constantly explore and innovate, and strive to improve the level of data asset management to better meet the development needs of the digital age. When colleges and universities begin to make full use of data asset management, they will not only improve their work efficiency and become better schools, but also help education become better and more innovative in the digital age.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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