Research on Data Governance in Higher Vocational Colleges from the Perspective of Digital Transformation

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Abstract: Driven by the digital age, HVC (Higher Vocational College) is facing the urgent need of digital transformation. Data governance has become a key issue. This paper studies the data governance of HVC from the perspective of digital transformation, aiming to explore effective ways to improve the level of data governance of HVC and help it achieve sustainable development in the digital wave. This paper analyzes the influence of digital transformation on HVC data governance, including the changes and opportunities of data governance environment. On this basis, the data governance strategy is put forward from the aspects of defining the objectives and principles, constructing the system framework and planning the implementation path. The research shows that building a scientific and reasonable data governance strategy can effectively cope with the impact of digital transformation, tap the value of data, provide strong decision support for HVC in teaching, scientific research and management, and improve the overall school-running level.

1. Introduction

Under the background of digital wave sweeping the world, the development of HVC is facing profound changes. Digital transformation has become the only way for HVC to enhance their competitiveness and achieve sustainable development [1]. In this process, data is the key factor of production, and its governance level plays a decisive role in integrating resources, optimizing management processes and improving education quality in HVC [2].

From a macro perspective, the state attaches great importance to the digital development of vocational education and has issued a series of policy documents to guide HVC to accelerate the pace of digital transformation [3]. Under the guidance of this policy, HVC have increased investment in information construction, accumulating a huge amount of data resources [4]. However, the lag of data governance makes these data fail to give full play to their value, resulting in endless problems such as "data islands" and "low data quality", which seriously restricts the process of digital transformation in HVC [5]. From the micro level, with the continuous expansion of the scale of HVC and the increasing management complexity, the traditional governance model is difficult to meet the development needs of the new era [6]. The amount of data generated by schools in teaching, scientific research, management and other aspects has exploded. How to effectively collect, store, analyze and apply these data to support scientific decision-making, improve teaching quality and optimize management services has become an urgent task for HVC.

At present, the academic research on data governance in HVC is still in its infancy, and the related theoretical and practical exploration needs to be further deepened [7]. The existing research mostly focuses on a certain link or level of data governance, lacking systematic and holistic research. Under the background of digital transformation, data governance in HVC not only involves technical changes, but also needs comprehensive planning and coordinated promotion from multiple dimensions such as strategy, organization and system [8]. The purpose of this study is to fill this gap. Through in-depth analysis of the status quo, problems and challenges of data governance in HVC from the perspective of digital transformation, a scientific and reasonable data governance system is constructed to provide theoretical support and practical guidance for digital transformation in HVC.

On the basis of combing the relevant literature, this study deeply analyzes the internal

relationship between digital transformation and data governance in HVC, draws on the successful experience of data governance in enterprises and other fields, and combines the characteristics and needs of HVC to put forward targeted and operable data governance strategies.

2. Theory of data governance in HVC

Data governance in HVC relies on the theory of digital transformation and the concept connotation of data governance itself. The application of digital transformation theory in the field of HVC emphasizes reshaping the business process, management mode and educational service of the school through information technology. This theory urges HVC to change from the traditional offline teaching and management to the digital mode of online and offline integration, so as to meet the new requirements of education in the digital age.

The concept of data governance has rich connotations, which refers to the collection of activities that exercise power and control over data asset management. In the scene of HVC, data governance aims to ensure the quality, security, availability and compliance of all kinds of data in schools [9]. Data governance covers data standard formulation, data quality management, data security and other aspects. These elements are interrelated and influence each other, and together constitute an organic whole of data governance.

There is a close relationship and mechanism between digital transformation theory and data governance. Digital transformation provides technical support and application scenarios for data governance, which urges HVC to collect more dimensional data and make in-depth analysis of the data by using advanced technology [10]. High-quality data can help HVC make scientific and reasonable decisions in the process of digital transformation.

3. Influence of digital transformation on data governance in HVC

3.1. Changes in data governance environment brought about by digital transformation

With the wide application of emerging technologies such as big data, artificial intelligence and cloud computing in HVC, the way of data collection, storage and analysis has fundamentally changed. This makes the sources of data more extensive and diverse, from structured data to semi-structured and unstructured data, such as teaching videos and students' online discussion records. In order to adapt to the digital transformation, the organizational structure of HVC has gradually changed from the traditional hierarchical to flat and networked. The information barrier between departments has been broken, and the data circulation is smoother. The school set up a special information management department, which is responsible for coordinating the data management of the whole school, coordinating the data resources of teaching, scientific research, management and other departments, and promoting data sharing and collaborative application.

3.2. Data governance challenges caused by digital transformation

The diversity of data sources leads to uneven data quality. As shown in Table 1, before the digital transformation, data quality problems mainly focused on data entry errors, accounting for about 30%. After the transformation, due to the addition of a large number of automatic acquisition equipment and third-party data interfaces, data duplication, data loss and data format inconsistency are prominent, accounting for 25%, 20% and 15% respectively. These problems seriously affect the analysis and application of data and reduce the decision support value of data.

Table 1: Comparison of Data Quality Issues Before and After Digital Transformation in HVC

Issue Type	Proportion Before Digital Transformation	Proportion After Digital Transformation
Data Entry Errors	30%	15%
Data Duplication	10%	25%
Data Missing	5%	20%
Inconsistent Data Formats	5%	15%
Others	50%	25%

Digital transformation makes the data of HVC face more security threats. In the process of network transmission and cloud storage, data is vulnerable to risks such as hacking and data leakage. With the expansion of data sharing, how to ensure the security of data flowing between different departments and partners has become an important challenge for data governance.

3.3. Opportunities provided by digital transformation for data governance

Digital transformation enables HVC to collect more comprehensive and detailed data. With the help of data analysis technology, school administrators can deeply understand the teaching, scientific research, student development and other aspects, so as to make more accurate decisions. Based on big data analysis, HVC can innovate service models and improve service quality. For example, through the analysis of students' life data, the school can predict the difficulties that students may encounter in life in advance, such as economic difficulties and psychological pressure, and provide help in time. HVC can also optimize resource allocation and improve work efficiency according to the work data of faculty and staff.

4. Construction of data governance strategy in HVC

4.1. Clear data governance objectives and principles

Facing a series of influences brought by digital transformation to HVC, HVC must construct scientific and effective data governance strategies, so as to fully tap the value of data and promote their sustainable development.

① Governance objectives

The core goal of data governance in HVC is to improve the overall operating efficiency and education quality of the school. HVC can provide strong support for teaching, scientific research and management decision-making by integrating and analyzing all kinds of data, and then help schools cultivate high-quality technical and skilled talents who can meet the needs of society.

② Follow the principle

HVC should adhere to the principle of "quality first, safety and controllability, sharing and cooperation, innovation and development". The principle of "quality first" ensures the accuracy, completeness and consistency of data, and lays a solid foundation for subsequent data analysis and application. The principle of "safe and controllable" emphasizes the security of data in the process of collection, storage and use, and effectively protects the privacy of teachers and students and school secrets. The principle of "sharing and collaboration" is committed to promoting data circulation and cooperation among departments and breaking data barriers. The principle of "innovation and development" encourages HVC to use new technology to tap the potential value of data and promote the innovation of school management and education and teaching mode.

4.2. Build the framework of data governance system

① Organizational structure level

HVC should establish a data governance organizational structure led by school leaders, led by information departments and participated by all business departments. In this framework, it is necessary to clarify the specific responsibilities of each department in data governance.

② The level of system norms

HVC should formulate a perfect data management system, which should cover all aspects of data collection, storage, use and sharing. HVC should clearly define the scope, frequency and mode of data collection to ensure the legality and compliance of data collection; Clearly define the format, duration and backup strategy of data storage to ensure the security and recoverability of data; Standardize the process of data use and sharing to prevent data abuse and disclosure.

③ Technical support level

HVC should introduce advanced data governance technology tools and build a unified data governance platform. The platform should have the functions of data integration, data cleaning, data analysis, data visualization and so on, so as to realize the management of the whole life cycle of

data. See Table 2 for details.

Table 2: Functional Modules of the Data Governance Platform in HVC

Functional Module	Main Function Description	Data Source	Application Scenarios	Expected Outcomes
Data Integration	Integrate multi-source data such as teaching management, student information, and research management	Various business systems within the college	Break down data barriers and achieve unified data management	Form a centralized and comprehensive data repository
Data Cleaning	Remove duplicate data, correct erroneous data, and fill in missing data	Integrated data	Improve data quality and prepare for analysis	Provide an accurate and complete data foundation
Data Analysis	Utilize statistical analysis to evaluate student performance and teacher teaching effectiveness; employ machine learning algorithms to predict student employment trends, course demands, etc.	Cleaned data	Assist in teaching, research, and management decision-making	Provide a basis for teaching improvement and program adjustments
Data Visualization	Display data such as student performance distribution, program enrollment, and research achievement statistics using bar charts, line charts, pie charts, etc.	Analyzed data	Intuitively present data results for easy understanding	Help decision-makers quickly obtain key information
Data Security Protection	Set access permissions, encrypt sensitive data, and prevent data leaks and attacks	Data from all stages	Ensure data security throughout the entire process	Prevent data loss and leaks, and ensure data availability
Metadata Management	Define and maintain information such as data definitions, sources, and relationships	Data generated by various functional modules	Ensure data consistency and traceability	Facilitate data understanding, management, and application

4.3. Plan the implementation path of data governance

① Data governance start-up stage

HVC need to carry out data governance demand investigation, evaluate the existing data assets of the school, and then formulate data governance strategic planning and implementation plan. At the same time, HVC need to set up a data governance team and carry out relevant training to improve the awareness and skill level of team members in data governance.

② Data governance construction stage

According to the framework of data governance system, HVC should gradually build a data governance platform and formulate and improve data management systems and standards. At this stage, relevant personnel should carry out data cleaning and integration, and centralize the data scattered in various departments to ensure the consistency and accuracy of the data.

③ Data governance operation stage

HVC should establish a monitoring and evaluation mechanism for data governance, and regularly evaluate and examine data quality, data security and data application effect. Based on the evaluation results, the organization should adjust its data governance strategies and measures in a timely manner. This ongoing optimization enables the achievement of the established data governance objectives.

5. Conclusions

This article focuses on the theme of data governance in HVC from the perspective of digital transformation, and obtains a series of results through in-depth research in many aspects. On the theoretical level, this article expounds the concept connotation of digital transformation theory and data governance in detail, and makes clear their close correlation and mechanism, so as to lay a solid foundation for subsequent research. Environmental change promotes the innovation of technology and organizational structure, but it also brings challenges such as data quality and security.

Based on the above research, the data governance strategy constructed in this paper is targeted. By implementing these strategies, HVC is expected to break through the dilemma of data governance, improve data quality, promote data sharing and tap the potential value of data. The data governance of HVC still needs to continue to pay attention to technical development and constantly improve governance strategies to adapt to the ever-developing digital education ecology.

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