Research on Optimization Paths and Strategies for Digital Transformation and Upgrading of Higher Education Institutions in the Digital Economy Era

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Abstract. In the era of digital economy, the digital transformation of higher education institutions is an important measure to promote the development of higher education. Digital education deeply affects the future development of human society, and promoting digital education is an inevitable trend that conforms to the development of the times. At present, with the advocacy of building a new ecosystem of smart education, the realization of the goal of digital transformation and upgrading in higher education institutions has become a focus of attention for schools, society, and even the country. This article analyzes the overall digital transformation of higher education from three dimensions: problems in the process of digital transformation, and optimization paths for digital transformation and upgrading. Using literature analysis and case study methods, this study first analyzed the digital development process and research status of domestic and foreign universities, and found that the digital transformation and development of higher education are very rapid and constantly exploring and improving, which is conducive to achieving high-quality development of higher education; But there are also certain problems, such as digital dependence, the transformation of major contradictions in education, the differentiation of educational information space, ethical and legal challenges, etc. Subsequently, a theoretical analysis of the optimization path for digital transformation in higher education institutions was conducted, and finally, the previous text was summarized, proposing optimization strategies for digital transformation and upgrading in higher education institutions. This study can provide reference opinions for achieving digital transformation and upgrading of higher education institutions in the era of digital economy.

Keywords: Digital economy, Higher education, Digital transformation, Internet plus education, Educational Metaverse.

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1 Introduction

The digital economy is an emerging economic dynamic that uses digital knowledge and information as key production factors, digital technology as the core driving force, and modern information networks as important carriers. In the 21st century, the digital economy has become a stabilizer and accelerator for national economic development, playing an important role in industrial transformation and upgrading. Digital transformation refers to integrating digital technology into all areas of activity, thereby changing the way to conduct these activities and how they bring value to people and society as a whole. As a type of modern service industry, the education industry is also deeply influenced by the digital economy. Digital transformation of education refers to the process of fully utilizing the advantages of digital technology in the education ecosystem to promote innovation in the system structure, function, and culture of education. The digitalization and informatization of education has been a topic of concern all over the world in recent years. "Internet plus", "scientific and technological revolution and smart education platform" all reflect the transformation of traditional education enabled by digital economy. Our focus is now on the development of higher education[1]. By empowering and innovating digital learning systems through new technologies or data that can promote the transformation and upgrading of the higher education field, which is of great practical significance for solving the dilemma of higher education and cultivating new talents who can adapt to the future society.

2 Existing Problems and Reasons

2.1 Digital Dependency

The development of science and technology, as well as the penetration of new generation information technologies such as the Internet and cloud computing into education, will to some extent lead to digital dependence. Universities tend to prioritize technology over human development, resulting in a stagnant learning space for students and falling into the "pure technical" misconception. The excessive reliance on digitalization can also lead to the solidification of teaching resources and teaching modes. Teachers rely on artificial intelligence for lesson preparation, and excessive reliance can lead to fixed thinking and lack of practical consideration for students, which goes against the professional ethics of teachers. The government need s to be aware that digitalization in education is still constantly developing, for example, artificial intelligence technology is still in the stage of continuous improvement. Although the application of artificial intelligence can help empower higher education and promote educational innovation, on the one hand, it can help teachers obtain rich teaching resources and enable them to conduct classroom teaching more effectively; On the other hand, it can analyze students' learning behavior and data more quickly, understand their learning styles and preferences, and further promote their personalized development. But there are also drawbacks, such as the proliferation of false knowledge, which can make students accept incorrect information, expose them to a large amount of information, lack active

thinking ability, and lead to a weakened sense of innovation; Teachers overly rely on artificial intelligence for teaching, neglect the individual development of students, and solidify teaching modes[2,3].

2.2 Transformation of the Main Contradiction in Education

In the process of digital transformation in education, teaching concepts, teaching modes, classroom teaching paradigms, and the application of smart teaching environments have undergone transformation. Due to the gradual digitization of traditional education and the integration of modern information technology into basic education teaching, traditional educational concepts, educational forms, teacher roles, teacher-student relationships, teaching and learning methods have been challenged. With the acceleration of digital transformation in education, the transformation of the main contradiction in education and the transformation of development methods have led to schools moving from the edge of society to the center of society, and diverse demands from educational stakeholders. Students are unable to quickly adapt to new learning methods, etc. In the era of highly developed digitalization, the laws of education are more hidden and difficult to grasp.

2.3 The Differentiation of Educational Information Space

Digitization has created new possibilities for the high-quality development of higher education. Virtual space and other technologies break the limitations of physical space and form multi-dimensional interactive teaching scenarios; Learning analysis based on big data provides a detailed record of learners' learning process, providing a technical foundation for process evaluation; Artificial intelligence frees teachers from heavy repetitive and mechanical labor, which helps to improve the quality and transformation of higher education. However, while digitalization of education extends the space of education, it also brings about the problem of differentiation in the information space, leading to educational inequality. Schools should be tools to bridge social disparities and inequality, and the popularization of higher education is a trend in the development of modern education systems. The differentiation of educational information space can actually be understood as the competition for resources, and with the increasingly advanced digital transformation of education, this invisible "competition" is becoming increasingly fierce, and the differentiation of educational information space is also becoming more and more serious[4].

3 Research Framework and a Theoretical Model

(1)Digital technology (T) level and high-quality development of higher education. The level of digital technology refers to the characteristics of the cluster digital technology itself and its relationship with the organization. It focuses on whether the digital technology can match with the organizational structure and whether it is coordinated with

the application ability of the organization. Big data, artificial intelligence, cloud computing and other digital technologies directly affect the effect and efficiency of data collection, and are an important basis and power engine to promote the coordinated and efficient development of the network within higher education clusters and drive the digital transformation to realize the high-quality development of higher education [5].

(2)School (O) level and high-quality development of higher education. The organizational level of the school refers to the organizational structure characteristics that match with the technology, which mainly focuses on the digital strategic objectives and planning, organizational structure, personnel digital capabilities and digital guarantee. Organizational level factors play an important role in the digital transformation of education and affect the speed and direction of the digital transformation of education. The digital strategic objectives and planning of educational organizations, institutional setting, digital literacy of teachers and students, and digital guarantee directly determine the practical feasibility and depth of the digital transformation of education, which is of great significance for promoting the high-quality development of higher education.

(3)Teaching environment (E) level and high-quality development of higher education. The teaching environment level refers to the teaching environment within the cluster, including the digital platform and tools used by teachers and students, teaching mode, teaching evaluation and teaching cultural atmosphere, etc. Have research pointed out that the digital value of digital technology is the key to realize the development of higher education quality, the kernel to transform and reorganize education ecological environment, to promote education mode, education process, education services, teaching evaluation, to truly achieve "learners as the center", and speed up the digital transformation of education, promote the development of education high quality. The construction of the index system for digital transformation of higher education is shown in Table 1

Table 1. Digital Transformation Indicator System for Higher Education

Secondary indicators	Specific observation items
T1 digital network construction	Campus network coverage rate (T11), outlet bandwidth (T12), network security (T13) situation [5,8]
T2 digital learning space	School Smart Lab (T21), Smart Teaching System (T22), and Smart Learning that connects school, home, and society [8,9]
T3 digital education resources	The university has digital resources (T31) such as Chinese and English electronic journals, electronic book database , subject teaching resource database (T32)and the number of MOOCs and quality online courses (T33) [10,11]
T4 Education data governance	Construction of school data management platform (T41), data control system (T42), data sharing (T43), data security (T44) [7,8]
O1 digital strategic objectives and planning	The formulation and introduction of the development goals (O11), planning process (O12) and planning documents (O13) of the school's digital transformation [8,9,12]

O2 organization	The school sets up a specialized agency (O21) to lead and support the digital transformation, and establishes multiple digital transformed working Agencies (O22) and Expert Adviser Organizations(O23) according to different functions [5,8]
O3 personnel digital capabilities	Digital leadership of school leaders (O31), digital ability of technical personnel (O32), digital teaching ability of teachers (O33) and the level of students' digital literacy (O34) [5,10,11]
O4 digital guarantee	School policy guarantee (O41), financial guarantee (O42), human resources guarantee (O43) [6,9]
E1 digital platform and tools	The school has a certain number of online virtual simulation teaching platforms (E11) and digital learning tools (E12), and can be mentioned for personalized and diversified learning services (E13) [6,8]
E2 new teaching mode	Teachers use diversified electronic equipment and technical systems to carry out teaching activities (E21), and the organization form combines online and offline(E22), emphasizing the student-centered two-way and even multi-directional interaction between teachers and students (E23) [5,10]
E3 digital teaching evaluation	The school has deployed the intelligent Classroom behavior analysis system (E31), and teachers use the intelligent teaching system to carry out diversified learning evaluation parties formula (E32), learning evaluation changes from traditional static and summative evaluation to dynamic, personalized and process evaluation and feedback（E33）[5,8]
E4 Digital teaching culture atmosphere	The school integrates intelligent technologies such as big data and virtual reality into teaching (E41) to create the cultural atmosphere needed for digital transformation(E42), forming a common culture and belief in digital transformation among teachers and students (E43) [8,9,12]

4 Case Study

4.1 Current Situation of Digital Transformation in Universities and Colleges

In recent years, domestic universities have made great achievements in digital transformation. Many colleges and universities actively use online courses, virtual reality, artificial intelligence and other technologies to promote educatio n and teaching innovation. For example, a well-known university has built an online teaching platform to share curriculum resources and improve teaching efficiency and quality. At the same time, some colleges and universities also explore the application of virtual reality technology in experimental teaching, providing students with more real and intuitive learning experience. Also, foreign universities have made a lot of breakthroughs in digital transformation. Universities use artificial intelligence technology to monitor and feed back students' learning progress and effects in real time, helping students to master knowledge and skills better. In addition, foreign colleges and universities also actively explore new online education models, such as flipped classroom, MOOC courses, to meet students' individualized and diversified learning needs.

4.2 The Case Study of Zhejiang University

ZheJiang University has formed a "full link integration"system in the whole process of student training, and adopted a "K-CPS"full link framework with a "knowledge map" as the core throughout the teaching classroom, solving the dilemma of traditional technical support systems that are difficult to interconnect. Online and offline can cooperate with the discussion, questionnaire, answer and other classroom interaction. Gather intelligent resources to help teachers prepare lessons easily and students quickly access learning resources. "Smart Cloud Classroom " Platform through the offline smart classroom to achieve all the courses in the school synchronous live broadcast, the course live broadcast connected to the educational system and automatically generated according to the system of the course teaching recording, truly all the courses are open, teachers and students share. In terms of publicity, based on the digital brand traffic of Zhejiang University education, we used "Zhejiang University Nail" to create "Zhiyun School " The video live broadcast platform provides push and video live broadcast service platform for many units in the province, and uses large traffic to spread and share popular science knowledge to the public.

4.3 The Case Analysis of Zhejiang University

From the above cases, we can draw the following inspiration and reference. Firstly, higher education institutions should pay attention to the concept of digital transformation and technical support. They should fully recognize the necessity and importance of digital transformation and actively introduce and apply advanced educational concepts and technological means. Moreover, strengthen the exploration and practice of innovative applications such as online courses and virtual experiment teaching should be attached importance to. Through the construction of high-quality online courses, the use of virtual reality technology to carry out experimental teaching and other ways to improve the teaching effect and learning experience. Lastly, the education institutions should establish a sound teaching data quality monitoring mechanism. Through real-time monitoring and feedback of students' learning progress and effect, timely adjustment of teaching strategies and methods to ensure the quality and effect of teaching.

5 Optimize the Path and Strategies

"Internet plus" education is a new form of education combining Internet technology and education with the continuous development of science and technology today. To make use of Internet plus education, first of all, the higher education institutions should pay attention to the part of education that cannot be replaced by the Internet. Secondly , the higher education institutions should improve the rules and regulations of Internet education, take advantage of the advantages of Internet plus education, further optimize the allocation of educational resources, meet the needs of teachers and students, break through the constraints of learning time and space, accelerate the reform of learning and teaching methods, and build an intelligent online learning platform, which can realize online live broadcast of offline classes Automatic recording allows students to

grasp key knowledge points in a timely manner while watching courses through functions such as AI speech recognition and PPT dynamic crawling.

6 Conclusion

On the basis of a thorough analysis of various relevant theories in the current academic community, this study still has significant shortcomings, which can be summarized as follows: in the case study, many small details of the reasons were not analyzed, and in the analysis of the problems and optimization paths in educational transformation, subjectivity is strong; Current research mostly analyzes and studies cases and situations that have already occurred. In dealing with unpredictable future events, the proposed optimization strategies have uncertainty and limitations, and specific problem specific analysis is required. These solutions may not necessarily have practical effects on future events; Finally, the lack of model hypothesis testing analysis has reduced the credibility of the article.

With the continuous development of the digital economy, empowering universities with digital transformation and development is a closely watched issue in China. There are areas for reference in this context in this study, but due to the uncertainty of the social environment and the limitations of the development of higher education institutions, the suggestions proposed in this article should be comprehensively considered based on the actual situation. And the research on the optimization path and strategy of digital transformation and upgrading in higher education institutions is not an overnight task, and its research is an emerging topic. On the basis of existing countermeasures and suggestions, this study puts forward some different views and suggestions on the optimization path and strategy of digital transformation and upgrading in higher education institutions. It is hoped that this article can provide some reference for future research, so as to provide valuable insights and contribute to related research in the future.

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