Analysis of the Development Trend and Hot Spots of China's Education Digital Transformation

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Abstract. In recent years, with the continuous development of Internet technology and the promotion of digital transformation, the education field has also shown the development trend of digital transformation. Researchers have begun to focus on the background, issues and challenges of digital transformation, and explore how to achieve the improvement of education quality in digital transformation and how to better use digital technology to serve the education business. By using the CiteSpace tool, this paper researches and analyzes the relevant literature in the field of digital transformation in education, and summarizes the corresponding hot spots and trends. Based on the analysis, this paper also puts forward suggestions and prospects for the future development of digital transformation in education.

Keywords: digital transformation in education · research analysis · development insights

1 Preface

The 20th National Congress of the Communist Party of China further clarified the deployment of "promoting the digitalization of education" based on the profound clarification of the fundamental status of education [1]. From a series of policies in China in recent years, we can see that the digital transformation of education has gradually become the focus of education reform and development. Digital transformation of education is an inevitable requirement for building a new education ecology, solving the contradiction between supply and demand of talents, and supporting high-quality development of education, and has become a new hot spot in the field of education. This paper uses CiteSpace, a visual knowledge mapping analysis software, to conduct a visual metrological analysis of the literature related to education digital transformation in the CNKI database, study its hot spots, evolutionary trends and development frontiers, and contribute to exploring a development path of education digital transformation with Chinese characteristics.

2   Research Methodology and Data Sample

CiteSpace is a JAVA-based scientific literature visualization and analysis tool developed by Prof. Chaomei Chen of Drexel University, which can help researchers visualize and analyze research data in terms of annual publication volume, keyword emergence, quantitative and qualitative analysis, and gain more insights into research and development based on this study.

In the China Knowledge Network (CNKI), "Digital Transformation in Education" was used as the theme, and the source category was set as "All Journals", and no search year was set. After eliminating those with low relevance, duplicate publications, and inconsistent types (conference proceedings, advertisements, etc.), 308 documents were finally obtained.

3   Research Results and Analysis

3.1   Analysis of the Number of Articles Issued

The number of academic papers is an important indicator of the research heat of - a field. Therefore, this study counted the annual publication volume of all domestic journals related to the field of education digital transformation on China Knowledge Network (CNKI) and drew a graph of the annual publication volume related to education digital transformation, as shown in Fig. 1.

Based on the statistical results of the number of articles, we can analyze that the years 2011–2021 belong to the basic development stage of China's education digital transformation research, and the number of research results on education digital transformation is relatively small, with 21 articles or less each year. 2022 and 2023 show a rapid increase in the number of articles, with a total of 211 articles. Accelerating the
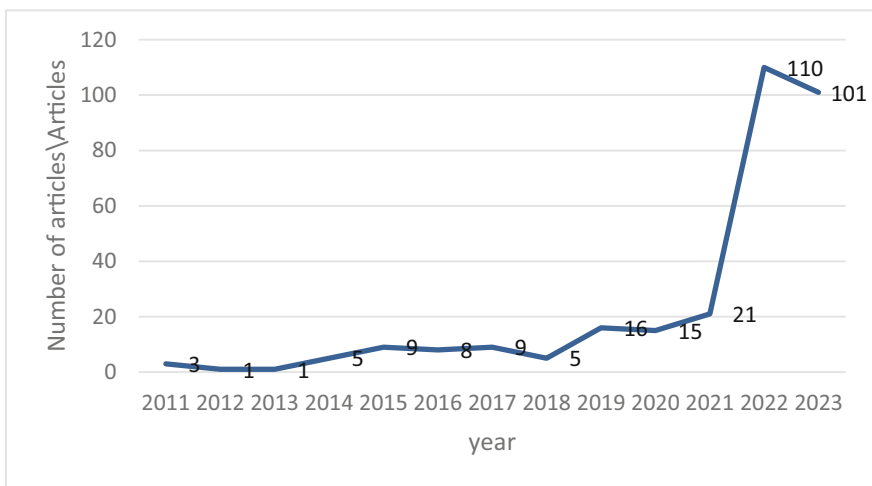

Fig. 1. Graph of annual publication volume related to digital transformation in education

digital transformation of education, promoting education innovation based on digital technology, and advancing education modernization with Education Information Technology are the necessary path for the high-quality development of China's education and an important part of building digital China [2].

3.2   Research Hotspot Analysis

The frequency, relevance, and emergence of keywords can reveal the research hotspots, intrinsic links, and research frontiers of the research field. The higher the frequency of keywords, the larger the node. The thicker the line, the higher the correlation between the two keywords. In the parameter setting, Node Types were set to Keyword to obtain the keyword co-occurrence map (see Fig. 2).

As can be seen from Table 1, the keywords with the highest frequency are educational publishing (34 times), followed by digitalization (33 times), vocational education (30 times), higher education (19 times), digital technology (14 times), artificial intelligence (9 times), and transformation (9 times), etc. These keywords have an important position in the field of educational digital transformation research and indicate the research hotspots in this field.

With the rapid development of a new generation of information technology represented by big data and artificial intelligence, new technological elements are injected into the publishing industry, and the pace of digital transformation of publishers is accelerated [3]. Educational publishers need to keep pace with the digital transformation and upgrading of education, which has given rise to more and more research results.

Digitization is another major keyword in the field of educational digital transformation research, and ranks very high in frequency. With the rapid development of information technology, digitization has become an integral part of the process. In the field of
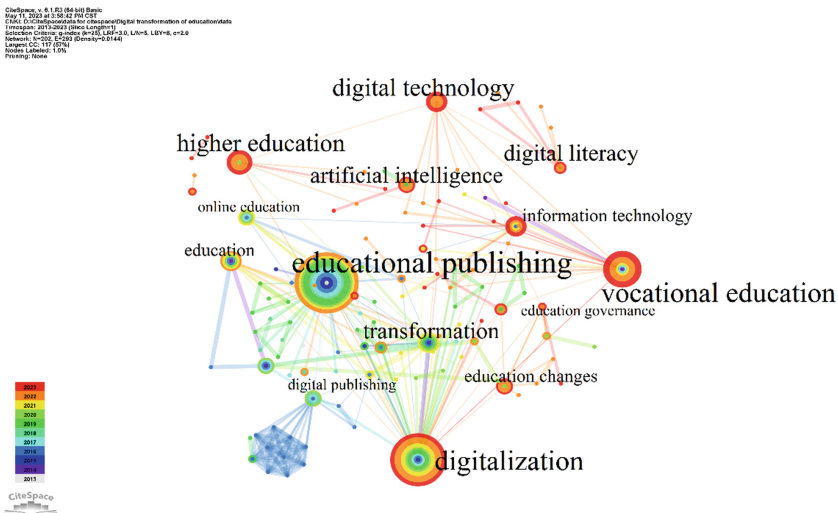

Fig. 2. Digital transformation keyword co-occurrence map

Table 1. High-frequency keywords in the field of education digital transformation research

Serial number	keyword	frequency	centrality
1	Educational Publishing	34	0.28
2	Digitization	33	0.32
3	Vocational Education	30	0.10
4	Higher Education	19	0.08
5	Digital Technology	14	0.10
6	Artificial Intelligence	9	0.02
7	Transformation	9	0.04
8	Digital Literacy	8	0.07
9	Information Technology	7	0.05
10	Education	7	0.02

education, digitization includes many aspects, such as digital teaching materials, online education, digital libraries, smart campuses, and so on.

Implementing the Digital Campus Specification for Higher Vocational Institutions and guiding vocational schools to systematically design overall school IT solutions are listed as one of the important tasks to improve quality and excellence in vocational education [4]. Digital transformation of vocational education can promote vocational education reform, help students better adapt to the future work environment, and provide more employment opportunities [5].

Higher education is not only an important channel for talent cultivation, but also an important foundation for national scientific and technological innovation and economic development. The digital transformation of education will certainly reconstruct the education ecology, realize the teaching without class and teaching according to the material, achieve a fairer, higher quality and more open education, and thus promote higher quality development of higher education [6]. Digitalization of education is an inevitable change in the form of education in the digital era [7].

Digital technology, another key term of interest in the field of research on digital transformation of education, also appears relatively frequently. Digital technologies include computer technologies, network technologies, Internet of Things technologies, and so on, all of which provide support for digital transformation.

Artificial intelligence technologies are being used in a wide range of educational scenarios, such as personalized learning: AI can customize different learning plans and resources for each student to meet their learning needs and interests. AI can replace teachers to assess homework and test answers, reducing their burden and providing more accurate assessment results. Smart-assisted teaching: AI can provide teachers with smart-assisted teaching tools such as natural language processing, data analysis and image recognition to help teachers better design and impart knowledge.

4   Research Findings and Recommendations

As a process that emphasizes technology to drive educational innovation and change, the emergence and practice of digital transformation in education has important developmental implications [8]. In China, the government, schools, and related institutions and educators are actively promoting digital transformation in recent years, and the following are specific suggestions and outlooks.

4.1   Government

The government should strengthen the formulation and implementation of digital education policies, establish a unified policy framework, and promote the landing and popularization of digital education.

The government should increase the investment and support for digital education, Improve the level of education information technology, and promote the development of digital transformation of schools.

4.2   For Schools and Other Types of Educational Institutions

Relevant institutions can play their own advantages and actively provide digital education-related resources, such as online courses, comprehensive teaching platforms, teaching videos, etc., so as to provide more learning tools and resources for students and teachers.

Schools can establish a rich and diverse online evaluation system, including web-based web-based exams, essay submissions, and multimedia presentations to better assess students' academic abilities and practical skills.

4.3   For Educators

Educators should strengthen their digital teaching ability, become familiar with They should master digital education tools and platforms, and apply digital teaching tools to enrich educational resources and improve teaching effects.

Educators can actively participate in the practice of online teaching, using online classes and live video streaming to carry out online teaching.

Educators can establish digital education communities, share digital education-related experiences and teaching resources, and establish digital education exchange platforms.

In general, the digital transformation of education will be an irreversible trend in the future. The government, schools, as well as related institutions and educators need to work together to promote the development of digital education, to improve the quality and level of education under the premise of ensuring the safety of digital education, and to lay a solid foundation for the future development of education.

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