Research on AIGC-driven digital transformation of education under the framework of new productive forces

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Abstract. The article aims to systematically explain the internal logic and collaborative mechanism between the new quality productivity of education, digital transformation, and AIGC technology, in order to provide a theoretical and practical framework for promoting systemic changes in education. The study first defined the theoretical connotations and characteristics of “new quality productivity of education” and “digital transformation of education”, and then focused on the technical characteristics of AIGC, demonstrating its deep integration into the entire process of education as a key driving force. Finally, a practical strategy system for AIGC driven transformation was constructed from five dimensions: teaching methods, resources, talent literacy, educational relationships, and data elements. Research has shown that the new quality productivity of education is the goal and advanced form of digital transformation, and educational digitization is the inevitable path to its realization. AIGC is the core practical carrier and catalytic force, forming a closed loop of “goal path tool”, jointly promoting the evolution of educational ecology towards intelligence, personalization, and lifelong development. The innovation of this article lies in proposing the dual attributes of "transformation" and “strong empowerment” of new quality productivity in education, as well as the "four chain" integrated ecology that relies on them, and constructing a five dimensional practical framework to systematically clarify the empowerment path of AIGC.

1 Introduction

The digital transformation originated from the development of computers and the Internet in the 1980s, and was initially closely related to the improvement of enterprise efficiency. The United States, Germany, China, the United Kingdom, and other countries have successively launched national level strategies to promote digital transformation and extend it to the field of education.

Internationally, the United States promotes “artificial intelligence+education” through the National Education Technology Program and the National Artificial Intelligence Research and Development Strategy Plan; Since 2015, France has successively launched

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the “Digitalization of Education” plan and strategy; Germany, on the other hand, has systematically promoted digital education through a series of plans such as “Digital Knowledge Society” and “Vocational Education 4.0”, reflecting the high importance that countries attach to the digital transformation of education. Currently, the digital transformation of education has become a global trend, with digital technology deeply integrated into the entire process of education, especially driven by new technologies such as AIGC (Artificial Intelligence Generated Content), leading to systematic changes in teaching resources, methods, relationships, and fields. AIGC, as a new type of content production method, has significant advantages in breadth, accuracy, and depth, which meets the requirements of advanced tools for new quality productivity. General Secretary Xi Jinping emphasized the development of new quality productive forces and closely integrated it with scientific and technological innovation and industrial upgrading, providing direction for the digitization of education.

In summary, the goal of digital transformation is to develop new quality productivity in education, and digitalization of education is its inevitable path. AIGC is the key driving force and practical carrier.

2 The connotation of digital transformation in education

Technological determinism emphasizes that technology is the decisive force driving social development. As a modern advanced productive force, digital technology will inevitably trigger profound adjustments in educational production relations, including management models, operational mechanisms, and educational relationships. This transformation is not simply the application of industrial technology, but the result of the active adaptation and innovation of educational subjects. The chain reaction triggered by technology will center around the education system and radiate to various fields of the economy and society, producing extensive and far-reaching impacts.

The “productivity theory” “dual attribute theory” or “multiple attribute theory” in the essence of education all recognize the close connection between education and various fields of society. Education should not only cultivate talents and reproduce labor force, but also become an integral part of advanced productive forces. Therefore, education must undergo digital transformation, absorb advanced social technologies to shape its own advanced productive forces, and cultivate new quality talents that meet the needs of the times, in order to contribute to the high-quality development of society.

The ecosystem theory views education as a complex ecosystem, characterized by non-linear and unpredictable development. The rapid intervention of technologies such as artificial intelligence has become an important variable driving the evolution of the system, which may trigger significant changes in the short term and present diverse results due to differences in subject applications. Digital transformation is essentially a “self-organizing” process without a fixed paradigm. While stimulating innovation vitality, it is also necessary to prevent technological abuse and thinking inertia. Therefore, it is necessary to deepen the integration and deep application of technology, truly unleash its educational potential, and support the sustained and effective transformation with technological vitality.

3 Characteristics of New Quality Productivity in Education

3.1 Possessing dual attributes of “being transformed” and “strongly empowered”

The education system needs to remain open and respond to the industry and society's

demand for new quality talents. The new quality productivity of education is not simply a combination of technology, but a systematic transformation that involves the entire process and process[1]. On the one hand, the education system needs to actively "transform", promote the coordinated evolution of the three elements, optimize the teaching process with technology, and always adhere to the fundamental principle of educating people; On the other hand, education should bear the responsibility of "strong empowerment", cultivate "sponge type" talents with continuous learning, tool application, and knowledge transformation abilities, connect full-time and lifelong education, and support industrial upgrading and high-quality development.

3.2 Transcend the "id" state and pursue "superego" effectiveness

Borrowing the concept of psychology, the "id" state refers to the tendency of educational participants to stick to their comfort zone and resist change, which can hinder the transformation process; The 'superego' state, on the other hand, manifests as a creative mind that is open and inclusive, follows rules, actively adapts, and pursues excellence. The formation of new quality productive forces in education requires educators to abandon the inertia of the "id" and actively embrace technological changes with a "superego" attitude, leading education to evolve towards high-efficiency forms.

3.3 An ecosystem that relies on the deep integration of the "four chains"

The development of new quality productivity in education requires the deep integration of the education chain, talent chain, innovation chain, and industry chain[2]. These "four chains" are intertwined: the education chain provides talent and intellectual support for industry and innovation; Updating the talent chain driven education model and content; Innovation chain stimulates technological breakthroughs and industrial transformation; The industrial chain provides real demand feedback to education, promoting the transformation and application of achievements. Through the organic collaboration of the "four chains", a "new quality" education ecosystem can be constructed, which is driven by innovation, supported by education, revitalized by industry, and produces a large number of talents. This system empowers the digital transformation and high-quality development of education.

4 Practical strategies for AIGC driven digital transformation of education

4.1 Digitalization of teaching methods: AIGC drives classroom reform

Teaching methods are the medium of teacher-student interaction, which has evolved from traditional classrooms centered around teachers, through flipped classrooms, smart classrooms, and online classrooms, to lifelong learning. Modern education places greater emphasis on cultivating students' autonomous learning, innovation, and cognitive abilities. In the process of digital transformation, the focus should be on: firstly, developing AIGC capability enhancement plans and usage guidelines, clearly incorporating digital literacy into talent training objectives, offering specialized courses to cultivate AIGC application capabilities and AI ethical norms, and synchronously conducting teacher training to ensure that they have corresponding guidance capabilities before course implementation; Secondly, we will promote the reform of classroom teaching models based on AIGC, support AIGC integrated innovation research and practice in OBE, case-based, situational and other

teaching models, encourage the formation of replicable typical cases, guide students to use AIGC to assist in research design, content generation and other tasks, focus on cultivating their ability to define problems, plan processes, optimize prompts, and develop clear assessment standards to prevent “digital inertia”; The third is to promote the evolution of interactive methods towards “AI style communication”, introducing AIGC tools in the classroom to guide students to explore the essence of problems through progressive and continuously optimized dialogues, shifting from random Q&A to prepared, evidence-based, and extensible intelligent interaction.

4.2 Digitization of teaching resources: AIGC driven resource construction and sharing

Teaching resources are the carriers of curriculum implementation and evaluation. In addition to traditional textbooks and courseware, digitalization has given rise to a wealth of online courses and question bank resources. The next step should focus on: firstly, building structured teaching materials generated by AIGC, using AIGC to transform knowledge points into visual graphs, and automatically expanding their theoretical origins, development trends, application scenarios, and discussion controversies, constructing a multidimensional and in-depth knowledge system, and improving learning effectiveness; The second is to develop diverse forms of AIGC generative resources, while strictly adhering to ethical and value bottom lines, using AIGC to build intelligent question banks, case libraries, and other resources. In this process, tasks need to be designed to guide students from passive acquisition of “digital humans” to “digital humans” who are good at questioning, identifying, and integrating, deepening the integration of industry and education, using AIGC to analyze real enterprise cases, and generate vivid teaching materials; The third is to build a resource sharing platform empowered by AIGC, integrate high-quality resources, use AIGC for knowledge graph construction and resource reproduction, break down resource barriers, expand the coverage and service capabilities of high-quality educational resources, and assist in the construction of education equity and lifelong learning system.

4.3 Digitization of Talent Literacy: AIGC Drives the Cultivation of New Quality Talents

Education ultimately serves the comprehensive development of people and the needs of industries. It is necessary to promote the integration of the “four chains” and cultivate new quality talents with digital literacy. Firstly, we must adhere to the principle of cultivating virtue and preventing ethical risks, strictly review teaching resources, ensure compliance with mainstream values, provide a recommended catalog of AIGC tools that have been screened, establish a usage tracking mechanism, guide students to establish a correct technical concept, and resist the erosion of harmful information; The second is to integrate technological innovation, shape vocational endowments, promote the deep integration of AIGC and teaching, design open-ended exploration tasks, encourage students to use AIGC for market analysis, program design, etc., produce personalized and innovative results, integrate industrial culture, and cultivate students' professional spirit and innovation ability in real or simulated vocational situations; The third is to cultivate “digital intelligence talents”, enhance comprehensive productivity, integrate the use of AIGC tools into the curriculum system and assessment evaluation, and systematically enhance students' “intelligence” in using technology to solve complex problems. Educators should provide high-quality data sources as “labor objects” to train students' ability to efficiently produce high-quality results through human-machine collaboration.

4.4 Virtualization of Educational Relationships: AIGC Driven Construction of Virtual and Real Education Relationships

AIGC is promoting the evolution of educational relationships towards the integration of reality and virtuality: firstly, creating platform AI teaching assistants, deepening teacher-student interaction, deploying AI teaching assistants in the teaching platform, providing personalized tutoring, Q&A, and review support for students based on course resources, extending classroom teaching, and building a coherent virtual real symbiotic teacher-student relationship inside and outside the classroom; The second is to build a virtual platform that integrates industry and education, connects learning fields, develops a virtual platform that simulates industrial practices, uses AIGC to restore business processes, decision-making scenarios, and operational difficulties, enabling students to obtain almost real vocational training in a safe environment, and strengthening the practical connection between industry, education, and students; The third is to establish an AIGC growth counseling zone, focusing on comprehensive development, and opening up an AIGC support zone for mental health, value guidance, and career development planning, making it a "digital mentor" for students, providing companionship, listening, and strategic advice while adhering to ethical principles, and assisting students in their social growth.

4.5 New Quality of Data Elements: AIGC Drives the Formation of New Quality Productivity in Education

Data is a key production factor in the digital age, and its effective utilization is the foundation for forming new quality productivity in education. Firstly, it is necessary to systematically construct and govern basic education data, systematically sort, annotate, and integrate scattered and original education data, form a structured and callable high-quality data resource library, and establish data security and property protection systems to provide "high-quality raw materials" for the deep application of AIGC; The second is to develop an AIGC tool application guidance system, compile mainstream AIGC tool user manuals, offer specialized courses and workshops, and build communication communities. Through systematic training and community mutual assistance, teachers and students can comprehensively enhance their tool application and innovative practical abilities; The third is to build an interdisciplinary integrated and shared resource library, respond to the trend of interdisciplinary collaboration, organize cross disciplinary faculty to jointly build an "AI+professional" integrated resource library, break down disciplinary barriers, avoid redundant resource construction, and support the training needs of compound digital intelligence talents.

The opportunity for AIGC to empower the digital transformation of education has emerged. This is a key opportunity to enhance the productivity of new quality education, and also a profound educational revolution. We must clarify the driving relationship between the new quality productivity of education, AIGC, and digital transformation, actively embrace technology, and shape future forms of education.

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