
Research on the Path of Artificial Intelligence-Driven Digital Transformation in Education

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Abstract: With the in-depth development of a new round of technological revolution and industrial transformation, artificial intelligence (AI), as the core driving force, has exerted a profound impact on educational ecology and teaching paradigms. Digital transformation in education has gradually become a crucial breakthrough in building an educationally powerful country, and the deep integration of AI and education has virtually provided a key path for this transformation. In view of this, this paper starts with the significance of AI-driven digital transformation in education, analyzes the existing problems in the current transformation process, and then puts forward targeted implementation strategies to promote the further development of educational digitalization.

Keywords: artificial intelligence; educational digitalization; transformation path

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1. The significance of AI-driven digital transformation in education

1.1. Reshape educational forms and promote all-round reform of teaching paradigms

At present, AI technology is gradually breaking the time and space boundaries of traditional education, triggering an all-round reform invisibly. In terms of teaching concepts, AI can more accurately capture students' learning behavior data, thereby gradually constructing a more scientific personalized learning profile for them, which is of great significance for promoting educational transformation^[1]. In terms of teaching content, the cross-border integration of "AI + majors" has gradually become the mainstream of curriculum reform. The National Smart Education Platform has gathered more than 1,000 high-quality AI courses, which can effectively realize the transformation from "mass production" to "personalized training". In terms of teaching methods, the wide application of tools such as intelligent teaching platforms can make online-offline blended teaching and immersive experience teaching the norm, and greatly enhance the interest and effectiveness of teaching work invisibly.

1.2. Empower educational equity and expand the coverage of high-quality educational resources

Educational equity is the core essence of high-quality educational development. The introduction of AI technology can effectively solve problems such as uneven resource allocation. China has a vast territory, and there are certain gaps in

educational resources between urban and rural areas and different regions. AI technology can build an inclusive digital education platform, which can effectively break the regional limitations of high-quality resources, allowing students in remote areas to enjoy higher-quality educational services^[2]. In addition, AI technology can more accurately push adaptive teaching resources and training content according to the educational needs of different regions. Through methods such as digital capacity training for teachers, it can effectively narrow the gap in teaching levels between regions, continuously improve teachers' technical application capabilities, which is of great significance for promoting the balanced allocation of educational resources, and enabling high-quality education to be "accessible to everyone, everywhere".

1.3. Align with national strategies and strengthen the adaptation of talent training to industrial needs

At present, China's digital economy is developing rapidly, and the intelligent transformation of various industries has an urgent demand for compound talents. As the basic project of talent training, education is not only an important scenario for the application of AI technology but also the source of talent supply supporting industrial intelligent transformation. AI-driven digital transformation in education can more accurately align with national strategies and industrial needs, further optimize the talent training structure, and thus greatly improve the quality of talent training^[3]. In the field of higher education, in-depth integration of AI with disciplines and majors can realize forward-looking layout, help cultivate more emerging interdisciplinary disciplines, and invisibly build a cluster of characteristic disciplines, transporting high-level talents for the development of the digital economy. As the intersection of talent training and technological innovation, universities can also greatly improve the efficiency of achievement transformation by promoting the reform of scientific research paradigms through AI technology, derive more disciplinary growth points, and provide solid talent guarantee and intellectual support for the construction of Digital China.

2. Problems faced by AI-driven digital transformation in education

2.1. Superficial technology application and deviation in supply-demand adaptation

Currently, the application of AI in the field of education mostly stays at the shallow auxiliary level, and has not yet achieved in-depth integration with all elements and the entire process of teaching. Many teachers face the awkward situation of "having tools but no methods, having equipment but no scenarios" in their work. At present, most AI tools focus on general functions, lacking in-depth adaptation and optimization for the knowledge systems of different disciplines and students' cognitive laws^[4]. In addition, there is a misalignment between some technical supplies and educational needs. The iteration speed of AI technology is very fast, while the reform of teaching models in the field of education is relatively lagging behind. This easily leads to the disconnection between some intelligent equipment and teaching needs, making it difficult to truly serve the improvement of teaching quality. At the same time, there is a large gap in technical infrastructure between different regions and schools. Schools in some underdeveloped areas are seriously insufficient in hardware configurations such as computing power resources and intelligent terminals, making it difficult for them to support the large-scale application of AI technology, which further exacerbates the digital divide in education.

2.2. Insufficient digital literacy of teachers and students, and capacity shortcomings restricting integration

As the core subjects of digital transformation in education, the digital literacy of teachers and students largely affects the depth and breadth of the integration of AI and education. At the teacher level, there is a common phenomenon of "skill anxiety" and "application confusion". Some teachers have insufficient knowledge reserves of AI and lack the ability to apply AI technology, making it difficult for them to effectively integrate AI technology into curriculum design and teaching implementation^[5]. Although some teachers have participated in some AI-related training, they lack effective guidance on the integration of technology and teaching methods, leading to cognitive lag when facing the rapidly iterating AI technology. Some teachers also have a certain resistance to AI, worrying that technology will replace their professional

roles, and some even experience professional identity crises, which will also affect the application of technology. At the student level, the digital literacy of most students is uneven. They lack information discrimination ability and critical thinking. Many students over-rely on AI to obtain answers, which greatly weakens their ability to think independently and solve problems, and some students even fall into “information cocoons”.

2.3. Prominent ethical and safety risks, and imperfect regulatory system

The wide application of AI in the field of education has brought many risks such as privacy leakage and ethical anomie, but the relevant regulatory system is not yet sound, making it difficult for teachers to effectively deal with these problems. In terms of privacy protection, AI teaching tools need to collect a large amount of students’ learning behavior data and personal information. Some AI platforms have problems such as excessive data collection scope, security vulnerabilities in storage and transmission, and some platforms have risks of data abuse and commercial utilization, which will invisibly trigger a trust crisis^[6]. At the same time, some platforms have not fully solicited the consent of students and parents during data collection, and failed to conduct high-quality desensitization processing of some sensitive data, which may infringe on the privacy rights and interests of minors. In addition, the development speed of AI technology far exceeds the establishment speed of ethical norms. Relevant laws, regulations and ethical guidelines have a certain lag, making it difficult to determine the boundaries of data use and the division of algorithmic responsibilities. In the long run, it is easy to appear an ethical vacuum.

3. Strategies for ai-driven digital transformation in education

3.1. Deepen technology integration and application, and build a new ecosystem of intelligent education

To improve the effect of AI-driven digital transformation in education, we can try to further promote the integration of AI with education and teaching, focus more on technical adaptability and scenario innovation, and actively solve problems related to superficial application. For this reason, we should continue to strengthen the construction of large AI education models, further improve multimodal corpora and high-quality independently controllable datasets, strengthen the safety assessment of various algorithms, and actively promote the vertical application of large models in fields such as ideological and political education and science education, which can effectively cultivate a new application paradigm of “AI + education”^[7]. For example, we can try to build a subject-specific large model to provide teachers with more intelligent support in curriculum design and case analysis, and also provide students with more personalized learning guidance and Q&A services. At the same time, we should try to unify educational data standards and interface specifications, take the initiative to break “data silos”, and build a cross-level and cross-regional educational data sharing network, which can effectively realize “one data source” and data interconnection. By promoting the integrated application of educational data with national population, industry and other data, we can more efficiently provide accurate support for educational decision-making and talent training. Moreover, we need to try to optimize the technical supply structure, encourage more enterprises and scientific research institutions to develop more intelligent teaching tools suitable for different disciplines, which can effectively break through technical bottlenecks in personalized learning and virtual simulation teaching.

3.2. Strengthen the cultivation of digital literacy and lay a solid foundation for transformation talents

In the practice of AI-driven digital transformation in education, we should focus on teachers and students to improve the digital literacy and skills of the whole people, and build a multi-level and full-coverage literacy training system, which can effectively solve the problem of capacity shortages. At the teacher level, we should further deepen the action of AI boosting teacher team construction, integrate digital literacy into the teacher education curriculum system, establish a regular rotation training system, and carry out special training on basic AI theories and interdisciplinary integration methods according to the needs of teachers^[8] in different academic stages and disciplines. At the student level, we can try to build

a connected digital literacy training system for primary, secondary and tertiary education, so as to better incorporate digital literacy into comprehensive quality evaluation. By offering general AI courses and characteristic courses, we can more efficiently cultivate students' technical application ability, information discrimination ability and innovation ability. Moreover, we need to guide students to use AI tools correctly, clarify the boundaries of human-machine collaboration, encourage them to use AI for the integration and analysis of various information rather than directly obtaining conclusions. By designing some high-order thinking tasks, we can effectively avoid students from over-reliance on AI technology and cognitive degradation. In addition, we should do a good job in home-school collaboration and actively carry out AI popularization and publicity, which can greatly improve parents' digital literacy and cognitive level, and help form a joint force in education.

3.3. Improve ethical and safety regulations and adhere to the bottom line of intelligent benevolence

In the work of AI-driven digital transformation in education, we should adhere to the principles of people-oriented and intelligent benevolence, take the initiative to build a comprehensive ethical and safety guarantee system, and prevent various risks of technology application. For this reason, we should further accelerate the improvement of laws, regulations and ethical norms in the field of AI education, clarify the boundaries and powers and responsibilities of various data collection and storage, and formulate standard specifications for data security and privacy protection, which can effectively fill the ethical vacuum. Teachers also need to actively implement the filing mechanism for AI algorithms and large models, and establish a higher-quality algorithm security assessment system, which can effectively avoid the occurrence of problems such as information cocoons^[9]. At the same time, we should strengthen data security and privacy protection, strictly follow the "minimum necessary" principle, standardize the collection process of various data, and ensure the right to know and consent of students and parents. Schools need to further strengthen technical protection of data security, actively carry out data encryption and desensitization processing, so as to gradually establish a data security emergency response mechanism to prevent risks such as data leakage and abuse. Moreover, we need to continuously strengthen ethical education and supervision, incorporate digital moral ethics into the digital literacy training system for teachers and students, continuously improve teachers' awareness of technology for good, and guide them to establish a more correct view of technical ethics.

3.4. Improve the collaborative guarantee mechanism and stimulate the internal motivation for transformation

In the AI-driven digital transformation of education, we should try to build a more perfect guarantee system to provide solid support for the digital transformation of education. For this reason, we should ensure the implementation of relevant policies. Local governments can formulate more targeted implementation plans in combination with regional realities, further refine task division and time nodes, and schools need to strengthen the supervision and evaluation of policy implementation to ensure that top-level design is transformed into specific practices^[10]. At the same time, we should continue to optimize the structure of capital investment, increase special investment in educational digitalization, focus on supporting the construction of large AI education models and teacher training, and by establishing a more diversified capital investment mechanism, we can encourage more social capital to participate in the construction of educational digitalization. Moreover, we need to strengthen the training of compound talents. Universities can further optimize the setting of disciplines and majors, add some majors related to the integration of AI and education, so as to cultivate more interdisciplinary talents who understand both technology and education.

Disclosure statement

The author declares no conflict of interest.

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