

Exploring the Pathway and Reference Significance of Digital Transformation in UK Education

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This paper systematically examines the three-tier advancement path of “organization-policy-technology” in the digital transformation of education in the UK and its implications for the modernization of education in China. It highlights that through top-level design, policy guidance, technological innovation, and ethical regulation, the UK has progressively established an efficient digital education system, offering systematic strategic references for China to address issues such as uneven resource distribution, superficial application, and ethical lag in digital transformation. The UK experience demonstrates that digital transformation in education requires coordinated efforts in policy, technology, culture, and institutions. China needs to base its approach on local demands while drawing from international experiences, promoting the leap from “tool assistance” to “deep empowerment” in educational digitization through top-level design, resource balancing, teacher empowerment, and ethical regulation, thereby contributing to the construction of a strong educational nation.

Keywords: United Kingdom, higher education, digitalization

Pathway Analysis of Digital Transformation in British Education

Gradual Institutional Development

The UK pioneered the integration of internet and digital technologies into education, establishing pioneering institutions for technological innovation early on. In 1993, the Joint Information Systems Committee (JISC) was founded as a non-governmental public entity. Through strategic guidance, multi-source funding, open educational resource sharing, and comprehensive reforms in teaching methodologies, it formulated detailed policy frameworks

Acknowledgments: This paper was supported by: 1. Key Teaching and Research Project of Shenzhen Polytechnic University in 2023: Research on the Adaptability of Higher Vocational Education under the “20+8” Industrial Layout of Shenzhen; 2. Institute of Economic and Social Development (Phase III) Project: 6025310002Q.

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and funding strategies to drive coordinated, sustainable development of higher education informatization. The Higher Education Policy Institute (UCISA), established in 2002, conducts in-depth research and publishes authoritative reports addressing critical challenges in higher education systems, providing policymakers and university administrators with cutting-edge insights and practical recommendations. Recognized as one of the UK's most influential independent think tanks in higher education, UCISA has significantly shaped policy-making. The Further Education Learning Technologies Action Group (FELTAG) of the United Kingdom was established in January 2013. Its main responsibility is to propose practical suggestions for effectively applying digital technologies in continuing education. In March 2014, this organization released a report—"Paths Forward to a Digital Future for Further Education and Skills", aiming to promote the wider and more effective use of virtual, hybrid and online learning in the fields of academic and vocational education. In February 2014, the Education Technology Advisory Group (ETAG) emerged as a dedicated advisory body focused on advancing educational technology integration within higher education and related fields. In July 2017, the Department for Digital, Culture, Media and Sport (DCMS) was established through the integration of four former departments. This new agency has made significant contributions to the digital transformation of the UK's education sector, playing a pivotal role in driving this initiative. From coordinating JISC initiatives to providing policy recommendations for UCISA and FELTAG, and offering advisory guidance to ETAG and DCMS, it has provided crucial organizational support for higher education's digital transition.

Continuous Policy Formulation and Reporting

In 2005, the House of Commons Education and Skills Committee released the "Schools White Paper: Higher Standards, Better Schools for All", highlighting the transformative power of information technology in personalized learning. In 2011, the Higher Education Skills Council (JISC) published "Technology Outlook: UK Tertiary Education 2011-2016", which explored emerging technological themes, key trends, and major challenges in teaching, research, and information management within the UK higher education system. In 2014, FELTAG released the report "Paths Forward to a Digital Future for Further Education and Skills", highlighting how digital technologies enable large-scale collaborative innovation among educators. The document provided recommendations across six key areas: digital technology adoption by learners, enterprise developers, and innovation investments. This initiative aimed to promote the broader and more effective use of virtual and blended technologies in academic settings. In 2019, the UK Department for Education's "Realising the Potential of Technology in Education" report pledged to accelerate campus internet infrastructure development and advance the adoption of digital technologies in higher education. In 2022, the Department unveiled "Future Opportunities for Education Technology in England", outlining the future direction and key challenges of digital education in the UK. In 2023, JISC released the "Framework for Digital Transformation in Higher Education", which comprehensively outlines how digital environments can support faculty and staff in their work and research. The framework emphasizes enhancing faculty and staff's sense of belonging and well-being through six aspects: data management and utilization, data communication and collaboration, and digital infrastructure, with detailed actionable plans provided for each area. In 2025, JISC published the case study report "How to Achieve Digital Transformation in Higher Education", aiming to provide higher education institutions with a proven set of methods and tools for digital transformation. This helps them improve efficiency, optimize processes, and better achieve organizational strategic goals through digital means under limited resources.

Promoting the Application of New Technologies

In recent years, the UK has actively adopted digital technologies such as MOOCs (Massive Open Online Courses), VR/AR, and GenAI in education. Since 2013, the UK has promoted the development and application of MOOCs, initially collaborating with 12 top British universities and institutions including the British Library, National Gallery, and Arts Council to provide open and free online courses globally. This initiative has positioned the UK among the world's top tier in higher education networking and internationalization. In 2017, Grimsby College's Higher Education and Continuing Education Schools pioneered VR/AR-powered immersive work simulations, such as a fully-realistic maritime logistics simulator that recreates shipboard environments for students. The emergence of Generative Artificial Intelligence (GenAI) in education in November 2022 marked a transformative shift, revolutionizing both educational philosophies and practices. In October 2023, the UK Department for Education's "Generative Artificial Intelligence in Education" report explicitly highlighted how strategic use of GenAI could enhance teaching effectiveness. In January 2024, the UK Department of Education and the Open Innovation Team jointly released "Generative AI in Education: Educator and Expert Perspectives", explicitly identifying "AI literacy" as a critical competency for educators adapting to the GenAI era. The document emphasizes the pedagogical value of GenAI and advocates for teachers' responsible use of AI tools, implicitly positioning AI literacy as a vital component of teaching expertise. In February 2025, UCISA's "2025 Student Generative AI Survey" recommended that UK higher education institutions establish dynamic assessment systems and review mechanisms aligned with AI advancements. It also called for strengthening teacher support networks through systematic training to ensure 70% of educators meet AI teaching competency standards within three years, implementing collaborative governance models by forming cross-institutional alliances to share testing resources, and integrating "responsible use guidelines" into academic regulations. In August 2025, the UK Department of Education released the revised "Generative Artificial Intelligence in Education" policy, emphasizing cautious adoption of GenAI technology in educational contexts. While advancing educational efficiency through technological innovation, it is equally crucial to establish rigorous risk management mechanisms. The document outlines three core principles for implementing GenAI in education: prioritizing safety, sharing accountability, and ensuring transparency and trustworthiness. These principles aim to safeguard the fundamental value of technology empowering education rather than replacing human educators.

The Significance of Learning From the UK's Educational Digital Transformation

Infrastructure and Technological Inclusiveness: Addressing Uneven Resource Distribution

Since 2000, the Chinese government has implemented a series of educational reform policies aimed at integrating information and digital technologies with teaching practices. According to official statistics, China has established the world's largest MOOC system, with over 30 online course platforms registered, boasting 483 million users and 1.39 billion learning sessions, ranking first globally in both MOOC quantity and user engagement. However, disparities in financial capabilities between universities and local governments have led to significant differences in adopting new technologies, exploring intelligent classroom innovations, and developing smart governance systems. For instance, the average IT budget per university under the "Double First-Class" initiative reached 18.183 million yuan in 2023, three times that of ordinary undergraduate and vocational colleges. Universities under the Double First-Class program and the Double High Plan demonstrate notably better wireless coverage, foundational software, and IT infrastructure compared to other institutions. A survey by China Education Network on university computing power development revealed that Chinese

universities face substantial challenges in sustainable development of computing platforms due to funding shortages, ecosystem deficiencies, talent gaps, and institutional shortcomings, with over 93.75% of institutions prioritizing “sustainable funding” as their core challenge. Statistics indicate that three key indicators for Chinese universities’ IT investments in 2024—total spending, per-student IT expenditure, and IT budget allocation—have significantly declined, making self-raised funds the primary source of IT expenditures in 2024. The proportion of new technology applications in Double First-Class universities and Double High Plan institutions is significantly higher than that in other regular universities and vocational colleges. From a regional perspective, since 2012, China’s central and western regions have explicitly proposed plans and policy documents for informatization and digital development. Years of sustained funding have brought considerable impetus to the informatization and digitalization of higher education in these regions. However, compared to eastern regions, there are still gaps in the total number of digital terminals in universities, per-student digital terminals, network multimedia classrooms, and their proportion of total classrooms. The scale of digital talent cultivation remains notably smaller, with per-student resources of e-books, electronic journals, and electronic theses in western region universities falling below the national average. In the past process of educational informatization and digitalization, the UK has consciously promoted balanced development of higher education digitalization through various policies and measures. A 2020 UK government survey revealed that 11% of young people accessing home internet lacked broadband connectivity, while another 6% had outdated home internet technology. During the pandemic, the UK government vigorously promoted nationwide digital infrastructure and blended teaching. The 2023 JISC-issued “Framework for Digital Transformation in Higher Education” (hereinafter referred to as the “Framework”) serves as the core guiding document for promoting balanced digitalization in the UK. This framework explicitly establishes “digital and hardware infrastructure” as foundational support and “organizational digital culture” as top-level guidance. Through a unified strategic vision (such as “making digital technology the core enabling tool for higher education”), it ensures that universities across different regions and levels (including Russell Group institutions and local colleges) adhere to consistent standards and directions in digital transformation, avoiding resource waste and widening gaps caused by “going it alone”. The Framework requires that “digital infrastructure construction should keep pace with technological development”, ensuring that network and hardware facilities in remote areas do not lag behind the national average, thereby narrowing the “access gap” at the grassroots level. The Framework identifies “improving digital infrastructure” as one of its six core strategies, explicitly proposing to synchronize infrastructure development with technological progress, provide targeted support for digitally underdeveloped regions, and enhance cybersecurity awareness in remote areas. In March 2025, the UK Department for Education announced a £45 million special fund to advance digital infrastructure construction in remote educational institutions and eliminate the education digital divide within the next year. The government has also set long-term goals requiring all schools and colleges to meet government-mandated standards by 2030, including broadband internet, wireless networks, network switches, digital leadership, filtering and monitoring, and cybersecurity. These experiences offer significant reference value for China’s efforts to promote balanced digitalization in higher education (such as digital transformation in central and western remote regions). This can be achieved through measures like “formulating a national-level framework for digital balance”, “targeted support for western infrastructure development”, “cultivating inclusive digital culture”, and “strengthening collaboration between eastern and western universities”, thereby driving nationwide balanced development in higher education digitalization.

Educational Philosophy and Application Depth: Transition From Scale to Quality

First, there are differences in the positioning of teaching objectives. The UK positions digitalization as a core means to “enhance teaching quality”, while China places greater emphasis on building a lifelong education system. In terms of strategic design, the UK has established a transformation mechanism through the Higher Education Digital Transformation Framework, characterized by “organizational coordination orientation, new infrastructure as the foundation, digital culture as the driver, and human-centered values”. It focuses on advancing “integration of teaching elements” (such as deep integration of digital technology with curriculum design and teaching evaluation). Practically, British universities concentrate on “multimodal knowledge delivery” (e.g., online courses, virtual experiments, generative AI-assisted teaching) and “optimizing student learning experiences” (e.g., personalized learning path recommendations, real-time feedback systems), directly linking the effectiveness of digital transformation to “improved teaching quality”. China’s higher education digital transformation places greater emphasis on the national strategic need of “lifelong education”, aiming to break the time-space constraints of education through digital technologies and build a “learning society for lifelong learning”. The underlying logic of this positioning is that digital technology serves as the “foundational support” for expanding educational coverage and promoting educational equity, rather than directly targeting “the intrinsic improvement of teaching quality”. From a policy perspective, China’s policies such as the Education Informatization 2.0 Action Plan and the Guidelines on Promoting New Educational Infrastructure Construction and Building a High-Quality Education System all regard “lifelong education” as a core objective, emphasizing the “inclusivity of digital resources” (e.g., the National Smart Education Platform provides 27,000 MOOCs, covering 166 countries). From the perspective of practical priorities, Chinese universities focus more on “the quantitative expansion of digital resources” (such as building smart classrooms, academic management systems, and digital libraries) and “the extension of educational services” (such as online courses for society and lifelong learning platforms), linking the effectiveness of digital transformation to “the expansion of educational coverage”. China’s “lifelong education orientation” has led some universities to excessively pursue the expansion of “resource quantity” in digital transformation while neglecting the connotation of “teaching innovation”, ultimately resulting in a coexistence of “quantitative inflation” of digital resources and “superficial application” in teaching. China’s “lifelong education” positioning makes universities prioritize “educational equity” and “coverage scope” over the connotation of “teaching quality improvement”. For instance, the Chinese government prioritizes visible resources (such as smart classrooms and MOOCs) while overlooking invisible teaching innovations (such as pedagogical model reforms). In contrast, over 50% of courses in the UK adopt blended teaching, whereas less than 30% of Chinese blended courses are certified. Most Chinese university teachers also view digitalization as an auxiliary tool, failing to recognize its core value in reconstructing the teaching process or utilizing “big data” to analyze student needs. From this perspective, the fundamental difference in positioning between China and the UK in higher education digital transformation lies in the distinction between “extensional expansion” and “connotative enhancement”. The issue of “prioritizing resources over innovation” in some Chinese universities stems from “positioning deviations”, “resource imbalance”, and “cultural constraints” under the “lifelong education orientation”. China can draw lessons from the UK’s Higher Education Digital Transformation Framework to establish a transformation mechanism of “organizational coordination + teaching innovation”, promote the deep integration of digital technology with “curriculum design, teaching evaluation, and teacher-student interaction”, and link the effectiveness of higher education digital transformation to

connotation indicators such as “innovation in teaching models” and “optimization of learning experiences”. Secondly, Chinese universities can attempt to adjust their digital investment structure by increasing funding for “teaching innovation” (such as teacher digital literacy training, teaching model reform projects, and generative AI teaching tool development). Finally, China needs to strengthen the cultivation of teachers’ “digital pedagogical thinking” to facilitate their transition from “technology users” to “teaching innovators”. For instance, by adopting the UK’s strategy of “comprehensive enhancement of digital literacy for both teachers and students”, systematic training programs such as “digital instructional design” and “AI-assisted teaching” can be implemented. Incorporating “digital literacy” into faculty promotion evaluation criteria will incentivize teachers to proactively explore innovative teaching approaches.

Teacher Development and Organizational Culture: Breaking Through Capacity and Institutional Barriers

The Education and Training Foundation (ETF) has implemented comprehensive measures through three key initiatives: establishing a professional framework for digital teaching, launching the EdTech Strategic Plan, and creating digital teaching platforms. These efforts, coupled with the Ministry of Education’s EDS qualification certification, have significantly enhanced teachers’ adoption of new technologies. The joint professional framework for digital teaching developed by ETF and JISC comprises seven elements, covering instructional design, pedagogical methods, and supporting students’ employability development. These elements provide teachers with actionable guidance to develop essential competencies in digital education. ETF has launched a digital learning platform designed to empower teachers’ self-directed professional growth. This resource offers free training modules that enable educators to innovate teaching practices, improve technology integration in instruction and assessment, and enhance student engagement. In 2019, the UK Department for Education’s “Unlocking the Potential of Educational Technology” initiative identified teacher digital literacy as a cornerstone of educational modernization. Multiple policy measures have been introduced to boost this capability, including providing training programs and technical support for higher education institutions, conducting comprehensive digital skill assessments to identify institutional gaps, and supporting institutions in optimizing digital teaching and learning efficiency. The 2024 report “Generative Artificial Intelligence in Education: Perspectives of Educators and Experts” issued by the UK Department for Education emphasized the educational value of GenAI and required teachers to use it appropriately. Although it did not explicitly propose incorporating AI literacy into educators’ “work assessments” (such as teacher title evaluations and performance reviews), it implicitly suggested that “AI literacy should be an essential component of teachers’ professional capabilities”. The 2025 “2025 Student Generative AI Survey Report” released by UCISA directly recommended that UK higher education institutions establish dynamic assessment systems, develop review mechanisms synchronized with AI technology advancements; strengthen teacher support networks through systematic training to ensure 70% of teachers meet AI teaching competency standards within three years; implement collaborative governance models by establishing cross-institutional alliances to share testing resources, and integrate “reasonable usage guidelines” into academic norms. China’s education sector still faces gaps in digital literacy training and certification for teachers. In 2022, the Ministry of Education issued the “Teacher Digital Literacy” industry standard, focusing on encouraging learning, research, and application of digital literacy among university teachers. In 2025, the “Notice on Organizing and Implementing the Digital Empowerment of Teacher Development Initiative” further proposed “establishing a teacher digital literacy development path guided by standards, using training and research as tools,

and characterized by application-driven practices and practical improvements”, while also advocating “deepening the application of technologies like artificial intelligence and big data in education to transform teaching philosophies, methods, and models, thereby enhancing educational quality”. Based on the UK’s digital education development progress, we believe that to truly implement educational digital transformation, governments should establish mandatory assessment requirements in teacher evaluation mechanisms alongside providing digital skills learning channels. For instance, setting up multi-tiered digital literacy assessments aligned with next-stage learning needs or practical job requirements would be more effective. Secondly, institutional reforms are needed to enhance organizational momentum for university informatization and digital transformation. As early as the beginning of the 21st century, most UK universities had established Chief Information Officers (CIOs) to coordinate IT infrastructure development and digital transformation initiatives. Top-tier institutions like Oxford and Cambridge, in particular, initiated their informatization and digitalization processes earlier. As the highest strategic leaders in university informatization, CIOs are tasked with maximizing information resource value, planning IT development paths, and ensuring deep integration of information technology with long-term institutional goals (such as improving teaching efficiency, enhancing research capabilities, and optimizing management processes). CIOs coordinate cross-departmental collaboration to build professional IT teams and improve campus-wide information literacy through training programs. From the perspective of current organizational and planning approaches to digital transformation in Chinese universities, at least the following issues exist: Universities have yet to reach a consensus on the value of digital transformation, with most narrowly interpreting it as merely the application of digital technologies and the establishment of digital platforms; investments and progress in university digital construction are fragmented, with budgets often allocated across different administrative departments, resulting in uneven distribution of digital infrastructure and failure to form effective planning; the responsibilities, rights, and interests within university digital construction departments are imbalanced. Information management departments, as the primary driving force behind digital construction, face relatively inadequate compensation and welfare benefits for their staff, coupled with limited opportunities for professional growth and promotion. In recent years, Chinese universities have also recognized the importance of institutional safeguards during digital transformation. Data show that the proportion of Chinese universities with full university-level leadership overseeing cybersecurity and informatization work has increased from 31.5% to 34.5%, while the proportion of universities fully implementing their cybersecurity and informatization development plans or annual schedules has risen from 34.8% to 47.1%. The pathways for personnel in university cybersecurity and informatization departments to participate in professional title evaluations have become increasingly diversified.

Ethical Norms and Academic Governance: Establishing Adaptive Systems

China has paid early attention to ethical issues concerning Homo sapiens artificial intelligence at the national level. For instance, the “Next Generation Artificial Intelligence Development Plan” issued by the State Council in July 2017 and the “14th Five-Year Plan and 2035 Long-Range Objectives Outline” in 2021 explicitly emphasized strengthening research on laws, ethics, and social issues related to Homo sapiens artificial intelligence, as well as establishing sound legal frameworks, institutional systems, and ethical standards to ensure the healthy development of AI. However, China’s overall ethical framework for AI usage remains in its infancy, failing to adequately address the new challenges posed by the rapid iteration of AI technology. From a technical perspective, ethical misconduct in AI educational applications primarily stems from ineffective data governance

and uncontrolled algorithmic decision-making.

Specifically, China currently lacks comprehensive policies and regulations addressing ethical norms for AI usage in higher education. Most of the existing policies merely offer general guidelines. However, they lack detailed regulations for specific situations such as plagiarism of content generated by artificial intelligence, algorithmic bias, and data privacy. Moreover, there is a disconnect between AI ethics research and practice in Chinese higher education. For example, most AI ethics research in this field remains theoretical, lacking actionable industry standards or technical guidelines to direct the practices of institutions and enterprises. Furthermore, mere norms are insufficient to ensure implementation. China must explore the establishment of multi-level collaborative enforcement mechanisms across government departments, industries, universities, and disciplines.

Globally, even though AI is still in the weak *Homo sapiens* artificial intelligence stage—capable only of performing specific tasks—its impact on social ethics has gradually emerged, such as plagiarism in AIGC-generated content and the “information cocoon” effect caused by algorithmic recommendations. However, China’s existing ethical frameworks in higher education have yet to respond to these issues in a timely manner. The root cause lies in the lack of AI ethics education, leading to cognitive biases among some university staff and students, which are incompatible with the rapid development of AI.

Currently, China’s academic community also lacks sufficient standards and technical means for detecting AIGC plagiarism. Due to the difficulty in distinguishing between AI-generated content and *Homo sapiens* creations, China’s education authorities and institutions lack clear criteria for identifying AI plagiarism. In September 2024, the Scientific Research Ethics Committee of the Chinese Academy of Sciences issued the “Integrity Reminder on the Standardized Use of *Homo Sapiens* Artificial Intelligence Technology in Scientific Research Activities”, emphasizing precautions and integrity issues in AI usage for research. In March 2025, the China Institute of Science and Technology Information, Elsevier, Cambridge University Press, and other institutions jointly released the “Guidelines 2.0 on the Boundaries of AIGC Use in Academic Publishing”, providing a basic behavioral framework and practical guidance for academic publishing. In the same year, several Chinese universities announced strict prohibitions on using AI to write theses, with AI-generated content exceeding 20% disqualifying students from graduation. However, overall, China has yet to introduce specialized laws or regulations targeting generative AI plagiarism. Legal constraints on AI usage in higher education lag behind technological advancements, making it difficult to enforce penalties and deter plagiarism effectively.

According to a Higher Education Policy Institute (HEPI) survey, the use of AI among UK students surged in 2025, rising from 66% in 2024 to 92%, with 80% of UK higher education respondents confirming their institutions had clear *Homo sapiens* artificial intelligence policies. Through legislative constraints and policy guidance, the UK has delineated clear boundaries for AI usage by higher education institutions, faculty, and students, ensuring compliance with legal and ethical requirements. For example, most UK universities have incorporated “AI Writing Detection” features in tools like Turnitin and Grammarly, combining technical tools with *Homo sapiens* review to enhance the efficiency and accuracy of detecting AI misuse. They have also established a complete process of “accusation-investigation-hearing-penalty” to ensure fairness and transparency in disciplinary actions. Additionally, UK universities generally classify AI misuse as academic misconduct, with specific penalty standards and procedures to ensure rule enforcement.

Regarding the protection of individual *Homo sapiens* data privacy, the “Data Protection Act 2018” (DPA 2018) serves as the foundational framework for UK data protection post-Brexit, supplementing and refining the

EU's "General Data Protection Regulation" (GDPR). This law emphasizes the rights of individual Homo sapiens data subjects, including transparency, access, rectification, erasure, and data portability. It also outlines legal bases for processing individual Homo sapiens data, such as consent, contract fulfillment, legal obligations, vital interests, public tasks, and legitimate interests. As of 2025, DPA 2018 remains the core legislation for UK data protection, working alongside UK GDPR to regulate all data processing activities within the country. For enterprises, compliance with DPA 2018 and UK GDPR is critical to ensuring data conformity and avoiding legal risks. In June 2025, the "Data (Usage and Access) Act" was passed by both houses of the UK Parliament, amending DPA 2018 and UK GDPR. This act comprehensively overjets multiple aspects of data management, aiming to balance data utilization and privacy protection while supporting the modernization of public services. Its core objective is to legislate clear rules for data access, sharing, and protection, providing a legal foundation for the UK's data-driven economy.

Currently, some platforms in China still excessively collect student behavioral data. It is recommended to formulate an "Educational Data Security White Paper" to define the scope of data usage.

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