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AI+Education: Accelerating Educational Model Transformation and Ecosystem Reconstruction in Media Institutions (Post-print)

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Abstract

As a representative of a new round of technological revolution, artificial intelligence (AI) technology has transformed or is transforming numerous industries and domains, education being among them. The Education 1.0 stage, centered on the "teacher", is transitioning to the Education 2.0 stage, centered on the "student". The core of this educational phase is founded upon big data, with "effectiveness and efficiency" as the evaluation criteria, truly achieving "teaching students in accordance with their aptitude" to provide personalized services for students, thereby reshaping teaching evaluation and educational management models. Consequently, traditional teaching models can no longer satisfy the demands of contemporary educational development and the construction of a strong nation; reforming educational models represents an inevitable developmental choice. This paper aims to investigate domestic and international applications of "AI+Education" from the perspective of AI technology's support for education, summarize the sub-fields and application scenarios of "AI+Education", and finally propose transformations and the reconstruction of the educational ecosystem for media education—including journalism and communication, artistic creativity, design, and content production—to adapt to the Education 2.0 environment centered on "students".

Full Text

AI+ Education: Accelerating Educational Model Transformation and Ecosystem Reconstruction in Media and Communication Institutions

Abstract: As a representative of the new round of technological revolution, Artificial Intelligence (AI) technology has transformed or is transforming numerous industries and sectors, with education being one of them. The teacher-centered

Education 1.0 phase is evolving toward a student-centered Education 2.0 phase. The core of this new educational stage is big data-driven, with "effectiveness and efficiency" as the primary considerations, enabling truly personalized instruction tailored to individual students and reshaping teaching evaluation and educational management models. Consequently, traditional teaching models can no longer meet the demands of contemporary educational development and national strength building, making educational model reform an inevitable choice. This paper examines the application of "AI+ Education" domestically and internationally from the perspective of AI technology's support for education, summarizes the subfields and application scenarios of "AI+ Education," and finally proposes strategies for reconstructing the educational ecosystem in media and communication education—including journalism, artistic creativity, design, and content production—to adapt to the student-centered Education 2.0 environment.

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1. Maturation of "AI+ Education" Technology and Accelerating Applications

Artificial Intelligence (AI) is the study of constructing artificial systems that simulate human intelligent activities and extend human physical and mental capabilities. The "AlphaGo" event triggered a new global wave of AI development. The 2018 Government Work Report detailed plans and expectations for educational industry development, emphasizing the strengthening of new-generation AI research and application while promoting "Internet+" across education, culture, and other fields. The maturation of AI technology has accelerated its widespread application in education, enhancing both educational quality and efficiency.

1.1 Rapid Technological Development and "AI+" Penetration Across Industries

AI technology has evolved through three stages: computational intelligence, perceptual intelligence, and cognitive intelligence. This progression moves from basic memory capabilities to auditory and visual perception, then to cognition and understanding, and finally to thinking—essentially advancing from primitive "mechanical intelligence" toward "human-like intelligence." Given the high

complexity and diversity of learners, educational applications require extensive participation and processing by AI technologies. The growing sophistication of these intelligent AI technologies provides a solid technical foundation for realizing "AI+ Education." Currently, "AI+ Education" is becoming increasingly intelligent, with applications gradually expanding. For example, intelligent oral speech assessment based on speech recognition technology enables precise analysis of teaching content and learning methods.

In recent years, driven by big data, deep learning, and GPU parallel computing, AI technology has achieved leapfrog development. Speech and visual recognition accuracy rates have exceeded 95%, making AI integration across industries imperative. The manifestations of AI technology are illustrated in Figure 1 [Figure 1: see original paper].

1.2 Maturation of Foundational AI Technologies Accelerating Educational Applications

Several foundational AI technologies have matured significantly, promoting AI applications in education. For instance, automatic short-text evaluation employs machine learning (deep learning) and natural language processing (NLP) technologies to achieve computational analysis and semantic understanding of short texts. Consequently, AI applications in education have crossed the critical point of industrial development and begun to accelerate. In traditional education models, teacher quality determines educational quality, and expanding teaching scale inevitably impacts both instructional quality and student learning outcomes. Thus, excessive dependence on teachers represents the root cause of challenges in the education sector. AI technology fundamentally reduces this dependency, improves teaching efficiency, and helps teachers personalize instruction according to student characteristics, making learning more effective.

1.3 Technological Development Facilitating AI Applications in Education

Similar to AI applications in other industries, technology drives "AI+ Education" applications, as shown in Figure 2 [Figure 2: see original paper]. Speech recognition and image recognition technologies have reached relative maturity, while capabilities requiring deeper understanding—such as speech translation and natural language comprehension—remain developmental. Future advancements in AI technologies in these areas will continue to drive application deepening. Currently, educational personalization exists only as an ideal state, with no fundamental changes to teaching methods or content. Despite its inherent characteristics that should make it a significant advantage, simply transferring classroom instruction to the internet fails to achieve true personalization and instead weakens the advantages of traditional classroom teaching. Intelligent systems can provide different learning resources and processes for each learner based on their level, content, difficulties, and motivation.

2. Application Scenarios of "AI+ Education" Domestically and Internationally

The primary transformations AI brings to education manifest in three aspects: first, learning experience—human-computer interaction reconstructs learning and builds more interactive instruction; second, personalized teaching—the integration of big data and deep learning makes personalized instruction a reality and the most important entry point in education; and finally, scenario applications—including virtual reality multi-carrier applications and multi-screen interaction as development trends, as illustrated in Figure 3 [Figure 3: see original paper]. This section analyzes and examines the application of "AI+ Education" domestically and internationally to gain insights into AI's educational applications.

2.1 Knewton's Personalized Learning Solution

Knewton's personalized learning solution is reflected in three aspects: (1) Recommendation functionality, which uses data analytics to determine what students should learn next; (2) Learning outcome data analysis, which predicts students' future performance based on assessments of their current learning level; and (3) An adaptive learning platform that guides students to learning content and activities best suited for them, automatically reducing course difficulty when students encounter difficulties. As shown in Figure 4 [Figure 4: see original paper], the system collects student learning data, analyzes the optimal next learning content, and recommends it to students. The data analysis platform can discover current effectiveness and future directions, while content adaptation guides students toward the most suitable next steps and automatically adjusts difficulty during learning challenges.

2.2 Harvard Chatbot-Assisted Teaching

"Chatbots" represent a contemporary example of AI-assisted teaching. For instance, "SochoBotis," developed by Harvard graduates, aims to reconstruct one-on-one instruction. The robot helps teachers test students' knowledge mastery and understanding, enabling teachers to focus on using the information provided by the bot to help students further explore content of interest. Simultaneously, it provides intelligent teaching assistance, helping teachers complete repetitive tasks such as attendance, grading, and proctoring. It also assists teachers in finding and organizing teaching materials, reducing their burden and improving work efficiency. Additionally, it helps students quickly retrieve needed resources or pushes targeted learning materials to help them manage learning tasks and time.

2.3 Duolingo AI Tutor

When discussing AI applications in education, AI tutors merit special attention. AI teachers simulate experienced teaching methods via computer and transmit knowledge to students with different needs and characteristics. A typical example is Duolingo, a language learning platform that introduces AI tutors to continuously question students, actively assess their answers, and provide a "self-service learning" experience.

2.4 Intelligent Analysis and Assessment

Thinkster is a mathematics tutoring platform integrating AI and machine learning. Thinkster Math applies AI to mathematics instruction, helping teachers identify problem areas, predict learners' future learning trends, and develop more targeted learning plans. Thirdspace Learning employs intelligent tracking and assessment: intelligent evaluation is an automated method for measuring student development that can replace manual physical and mental labor, significantly reducing time while improving accuracy. AI-powered automatic assessment pathways can track student achievement and conduct appropriate evaluations. For example, Thirdspace Learning integrates AI into its platform practice to help track student progress and optimize its services.

2.5 New Oriental's "Robot Teacher"

Intelligent Tutoring Systems (ITS) developed from early computer-assisted instruction, simulating one-on-one intelligent teaching activities and representing a typical AI application in education. In recent years, such experiments have begun at New Oriental. In classrooms without human teachers, "robot teachers" search for key knowledge points and conduct instruction after collection and instructional design. However, teaching without human teachers remains incomplete, as teachers are still needed for knowledge integration and for helping students develop creative and critical thinking. The organic combination of robot intelligent teaching, teachers' emotional innovation capabilities, and student learning represents the future trend of classroom development, enabling comprehensive thinking training for students.

2.6 Yuanfudao's Photo Search and Student Ability Prediction

"Yuanfudao" provides personalized question banks for students through adaptive question databases and offers real-time online consultation based on individual student problems, helping students understand their learning processes, stimulate practice interest, and improve learning outcomes. The product fully utilizes deep learning technology and GPU parallel processing to improve formula recognition accuracy. Student ability prediction applications combine student characteristics with subject features to forecast performance, with future potential for further application in student recommendation systems.

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3. Subfields of "AI+ Education"

Minister of Education Chen Baosheng noted that the deep and widespread application of AI technology in education will achieve information sharing and data connectivity, driving changes in the overall educational operation process and enabling personalized education at scale. AI's penetration in the education sector has broken the traditional educational ecosystem and evolved into several common subfields.

3.1 Application Segmentation of "AI+ Education"

AI applications in education can be categorized into two specific types: assisted teaching and assisted learning, as shown in Figure 5 [Figure 5: see original paper]. Assisted learning comprises AI learning tools, including using AI to collect and process information and leveraging AI to rapidly improve learning effectiveness. Assisted teaching refers to teachers using AI as a tool to replace part of their labor, such as assisting with grading, lesson preparation, and personalized homework assignment.

3.2 Main Application Areas of "AI+ Education"

AI applications in education can be divided into six domains, as shown in Figure 6 [Figure 6: see original paper], primarily including: personalized learning, intelligent assessment, intelligent tutoring, simulation and gamified teaching platforms, educational decision-making, and early childhood education robots. Foreign companies tend to focus more on assisted learning domains such as personalized learning software, intelligent tutoring, and simulation-based learning, while domestic companies have made more progress in assisted teaching domains like test grading and instructional evaluation.

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4. Ecological Reconstruction of Media and Communication Arts Education

AI technology is gradually penetrating journalism, news broadcasting, content creation, artistic design, music composition, and multiple other aspects, innovating concepts in artistic design, media content creation, and journalism while enhancing methods and approaches for artistic creativity, design content, and news dissemination. Consequently, AI significantly impacts media and communication education, bringing transformation to educational philosophies, models, and teaching plans in journalism and arts. Media and communication institutions urgently need ecological reconstruction in their relevant professional education to fully implement personalized teaching services for students and improve educational quality.

4.1 AI Reshaping Art and Creative Design Education

From current AI application scenarios, when applied to problems with clear boundaries, conditions, and outcomes, humans will undoubtedly lose to machines. For example, in visual arts, image content and style are inseparable yet relatively independent. According to recently developed intelligent algorithms, if two images are decomposed using convolutional neural networks to extract content and style and then reconstructed, "content preservation with style transformation" can be achieved. However, content creation through such logical deduction is often unreliable. The perceptual creativity and design of artistic content represent what AI cannot replace—elements that AI cannot perceive or understand.

Therefore, art education should emphasize artistic content creativity, which machines cannot replicate. While powerful computational capability is part of AI, the outstanding literary foundation, excellent moral qualities, and the ability to flexibly manage communication, audience connection, and live presence across different contexts and occasions are qualities that robots cannot imitate. Consequently, AI anchors cannot completely replace human hosts in the short term and require complementary collaboration. Educational ecosystem reconstruction is necessary to cultivate anchors who cannot be replaced by robots.

4.2 AI Reshaping Music Education

Music education itself constitutes part of arts education but differs from content design in other artistic disciplines. On one hand, "AI+ Music Education" can generate melodies, automatically harmonize, produce harmonic sequences, and create two- or four-part counterpoint, using neural networks to learn sound characteristics and synthesize entirely new sounds. On the other hand, it transforms traditional teaching models. In conventional music classrooms, teachers provide guidance on rhythm patterns through physical instrument interaction and demonstration, requiring students to practice instruments repeatedly. However, based on AI technology that perfectly integrates with music education, computer-simulated human learning can record performance data, analyze and compute it, and thereby calculate student performance scores to effectively improve practice levels. Consequently, music teaching methods and curricula require redesign and educational ecosystem reconstruction.

4.3 AI Reshaping Media Content Innovation Education

AI can complete cluster analysis of media content based on big data. Current AI can easily retrieve all footage of plot twists in media stories from big data, perform cluster analysis on media content, and automatically edit it using AI editing software with brief text, making content creation remarkably simple. Simultaneously, AI has already enabled user profiling for media works and subsequent film and television recommendations through algorithms or collaborative filtering—results of the "big data + AI" era.

Although AI can perform cluster analysis of media content, it cannot yet understand or appreciate the connotations expressed in works in the short term, creating a semantic gap. Therefore, media content education should focus more on content creativity, necessitating educational ecosystem reconstruction for content innovation.

4.4 AI Reshaping Anchor/Broadcaster Education

Continuous improvement in AI technology has enabled significant progress in intelligent robots. The debut of AI-synthesized anchors at the Fifth World Internet Congress undoubtedly created a new content production and dissemination method, posing an impact on contemporary broadcasting and hosting majors and presenting new challenges to traditional news broadcasting. Moreover, AI features deep learning, network data analysis, and real-time large-scale online and offline concurrent interaction, ensuring program accuracy and replacing repetitive anchor work. This inevitably leads to transformation in anchor education.

However, while AI anchors can ensure program accuracy, they cannot replicate the outstanding literary foundation, excellent moral qualities, and flexible management of communication, audience connection, and live presence across different contexts that human hosts possess. Therefore, AI anchors cannot completely replace human hosts in the short term and require complementary collaboration. Educational ecosystem reconstruction is necessary to cultivate anchors who cannot be replaced by robots.

4.5 AI Reshaping Media Communication Education

With the development of various AI technologies, news content can now complete the entire process from data collection and analysis to presentation within big data ecosystems. Data journalism in this format represents a trend in news reporting, compensating for deficiencies in traditional journalism. Data journalism is an innovative news production model enabled by AI technology, such as robot writing, sensor journalism, and visual journalism. “The future of news is data analysis.” In journalism, using data can facilitate news reporting and information dissemination through intelligent robots employing natural language technologies for collection, Q&A, and machine writing, as well as content push and subsequent news impact tracking.

Currently, journalism and communication education focuses primarily on news content creation and dissemination. However, future media is already developing toward integrated and intelligent media. Therefore, journalism talent cultivation must include learning news data analysis, mining, and visualization technology practice. Future media reporting requires enhancing students’ big data thinking and excellent data analysis capabilities in news reporting. Consequently, the goal of journalism education should be the intersection of computer science and journalism, cultivating composite data journalism talents who understand

journalism, design, and programming.

The rapid development of AI technology across various industries will gradually apply to the education sector. The traditional teacher-centered education model must transition to a student-centered model, gradually impacting media and communication education in journalism, artistic creativity, film and television production, and other areas. This urgently necessitates ecological reconstruction in media and arts education, reshaping talent cultivation specifications, educational philosophies, models, and teaching plans. The current applications of AI in six educational subfields and application models in domestic and international education provide excellent references for educational reconstruction in media and communication institutions, helping students integrate new developments into their learning and lives to actively create future society.

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