The Trend and Countermeasures of Deep Integration of Artificial Intelligence and Higher Education

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Abstract: In future education, artificial intelligence technology can provide "navigational" services for learners' deep learning and provide assistance for learners' learning paths, which is an adaptive learning method. Under artificial intelligence analysis technology, personalized learning becomes possible. Artificial intelligence frees teachers from daily teaching activities. Artificial intelligence cannot completely replace teachers, but teachers who use artificial intelligence will replace teachers who do not use artificial intelligence. The combination of artificial intelligence and higher education is also an important feature of future education development. "Artificial Intelligence + Education" is causing a revolution in higher education. Artificial intelligence has now profoundly affected the development of education in China, triggering challenges in education reform and future development. How to grasp this challenge in a timely manner and provide effective policies and suggestions for the next reform of universities is crucial.

1. Introduction

The *Report on the Development of Artificial Intelligence* in China released in July 2018 clearly pointed out that the establishment and improvement of a modern education public service system urgently needs to promote a deeper integration of artificial intelligence and education, and cultivate new talents that meet the needs of international competition. In May 2019, UNESCO issued a report that clearly pointed out how artificial intelligence technology can help educational systems use data to promote education equality and improve education quality as the core, helping students prepare for the challenges of the future development of artificial intelligence. Subsequently, the International Conference on Artificial Intelligence and Education was held in Beijing and adopted the *Beijing Consensus on Artificial Intelligence and Education*, which established a strategic consensus on the deep integration of artificial intelligence and education. It was proposed that the advantages of artificial intelligence should be fully exploited, educational innovation and reform should be promoted, an open and flexible education system should be built, inclusive and fair quality education should be ensured, and lifelong learning opportunities should be enjoyed by all people. It can be seen that the deep integration of artificial intelligence and education is an inevitable trend to promote the high-quality development of higher education in China.

2. Achievements Achieved in the Integration of Artificial Intelligence and Higher Education

2.1. Intelligent Educational Robot

The intelligent educational robot can take the place of teachers in teaching environment, including assisting teaching, providing classroom teaching content, helping teachers to manage teaching process, answering questions after class, etc. . The teacher will be freed from the tedious teaching task, so that teachers have more time to pay attention to the development of students' attitude, emotion, good moral character and practical ability. But at present, the intelligent educational robot is only a kind of software educational robot in the primary stage. Compared with the online teaching on the Internet, the intelligent educational robot mainly assists the teachers to focus on the students' individual development, which shows higher accuracy and gives students a higher sense of participation

2.2. Intelligent Teaching System

The system uses artificial intelligence technology to provide teachers with services such as learning situation analysis, resource recommendation, classroom management, intelligent environment creation, intelligent evaluation, and decision-making assistance. An artificial intelligence teaching system with comprehensive subject resources can provide a constructive learning environment for education and teaching, assist in personalized teaching and learning, and reduce the teaching burden of teachers. The advantage of intelligent teaching systems is to bring greater development space and potential to students, and alleviate the problem of teachers focusing on student groups and lacking attention to individual students in the current large class teaching environment. At the same time, it also provides a scientific platform for personalized learning for students, developing their computational thinking ability and abstract concept understanding ability. Multidisciplinary content can enhance students' interest in learning and promote their comprehensive literacy.

2.3. Intelligent Online Learning Platform

This platform makes individual autonomous and personalized learning possible. Utilize the online learning platform of Internet big data to evaluate students' learning situation based on their historical learning data, predict their subsequent learning needs and performance, and intelligently recommend suitable learning content and methods, thereby targeted to improve learning efficiency. Currently, intelligent automated evaluation systems have been widely used in the language field, including automated essay evaluation and oral evaluation, triggering significant changes in evaluation methods, forms, and means.

3. The Trend of Deep Integration of Artificial Intelligence and Higher Education

Artificial intelligence technology is widely used in the field of education, forming a new trend of deep integration of artificial intelligence and education, mainly reflected in the following three aspects.

Firstly, leading the new trend of mixed teaching. Online and offline learning scenes, physical and virtual learning spaces are connected after the emergence of artificial intelligence. The connectivity of learning spaces and the flow of learning data have led to the formation of a three-dimensional teaching field that integrates multiple spaces, and the hybrid teaching model has high-quality soil for growth. The hybrid teaching supported by artificial intelligence technology is not a simple combination of online teaching and face-to-face teaching, but a new mechanism for the integration and symbiosis of the two, representing a new concept of dual line integrated teaching. It can improve the quality of teaching services, optimize resource allocation patterns, and enrich learning activities through the integration of data and information, thereby advancing towards "taking into account" large-scale and differentiated teaching, and providing protection for building a "student centered" and "student based" teaching ecology. Of course, at the present stage, there are still problems with hybrid teaching enabled by artificial intelligence, such as insufficient data connectivity, inadequate application of teaching tools, and unreasonable selection of teaching modes. It is necessary to break through the difficulties of technology research and development, improve teachers' hybrid teaching ability, and improve the development guarantee mechanism of hybrid teaching modes to make hybrid teaching take advantage of the wave of artificial intelligence to achieve significant development.

Secondly, bringing a new vision of human-machine symbiosis. With the participation of artificial intelligence, the traditional "teacher-student" teaching paradigm has gradually evolved into a "teacher-machine-student" ternary interactive mechanism, resulting in the formation of a multi agent collaborative educational scene, and education is about to usher in an era of symbiosis between humans and machines. Human-computer symbiosis means "learning from each other's strengths and complementing each other"s weaknesses" between humans and machines, giving full play to the potential of integration, and achieving deeper and higher level interaction, collaboration,

and integration, rather than simple artificial intelligence assistance and enhancement. Under the concept of human-computer symbiosis, human teachers and artificial intelligence teachers jointly play the roles of guides for students' learning, promoters for students' development, and caregivers for students' emotions. Together, they are committed to improving students' learning experience and achieving quality and efficiency improvement in "teaching" and "educating" work. Although people have opened the door to the collaboration between human intelligence and machine intelligence, the direction of teacher role reconstruction and responsibility transformation is unclear, and it is difficult to generalize technology and transfer strategies among different artificial intelligence education products, as well as problems such as algorithm black box, technology alienation, and data ethics continue to exist. This requires educators to carefully consider how to achieve a new vision of human-computer mutual trust, how to be a "gatekeeper" for the deep integration and sustainable development of artificial intelligence and education, and how to do artificial intelligence+education with temperature and humanistic implications.
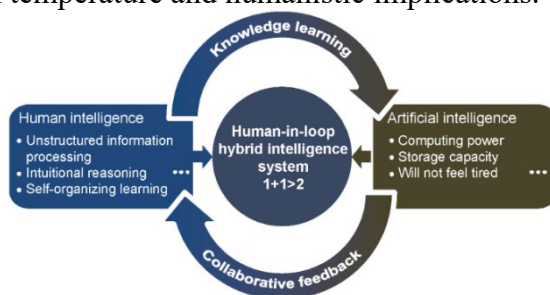

Figure 1 Human Intelligence and Artificial Intelligence Collaborative System

Finally, opening up a new path to lifelong learning. Artificial intelligence provides lifelong learning opportunities for every learner. For ordinary learners, artificial intelligence is constantly blurring the boundaries between formal and informal teaching, and learning forms such as fragmented learning, game-based learning, and hybrid learning have greatly expanded the boundaries of knowledge acquisition. For special learners, educational products and applications designed using artificial intelligence technology can meet the needs of learners with disabilities in literacy, reading, social interaction, and effectively promote fairness and inclusiveness in education. In addition, the integration of artificial intelligence in the field of education has the characteristics of humanization, contextualization, integration, and digital intelligence driving, which can realize the attention to the personalized characteristics of learners and continuous evaluation of their development status, build a platform for the formation of intelligent, dynamic, lifelong electronic archives, and help establish a lifelong learning system that everyone can learn, everywhere, and anytime. However, if lifelong learning is to be successfully implemented, it still requires a series of measures such as strengthening technology penetration, achieving theoretical innovation, and formulating guidelines, which has a long way to go.

4. Countermeasures of Deep Integration of Artificial Intelligence and Higher Education

4.1. Focusing on Basic Theoretical Research and Key Technological Innovation

When conducting basic theoretical research on the integration of artificial intelligence into education, it is necessary to comprehensively consider many factors such as education and learning theory, society, culture, and economy, view the application of technology in education and teaching from different perspectives such as philosophy, education, and information science, consolidate the theoretical foundation, and strive to form a closed loop from theoretical research, technology development, educational application, to practical feedback. When facing artificial intelligence+education technology, it is necessary to use the needs of educational development to force the research and development and upgrading of artificial intelligence technology. While achieving technical precision, colleges and universities should understand the mechanism and laws of intelligent education supported by artificial intelligence by exploring issues such as algorithm

black box, algorithm interpretability, and deep learning analysis research, so as to promote artificial intelligence towards cognitive intelligence and break through the application limitations of artificial intelligence technology in education.

4.2. Paying Attention to the Construction of New Infrastructure and the Cultivation of Talent Team

To implement artificial intelligence technology in educational practice, it is necessary to fully understand the application characteristics of technology in the field of education and the development trend of future education, implement new infrastructure for education, facilitate the construction of formal and informal learning venues or scenarios, and lay a solid material foundation for enhancing the supply of high-quality educational services. In addition, the practical work of artificial intelligence+education also needs strong talent strength to support. Therefore, it is necessary to comprehensively enhance teachers' ability to flexibly use artificial intelligence technology to carry out intelligent teaching activities, enhance the "soft power" of the artificial intelligence+education talent team, achieve changes in teaching models and educational concepts, make artificial intelligence technology available, easy to use, and commonly used in the field of education, and assist in multi-level, innovative, and personalized talent cultivation.

4.3. Promoting Interdisciplinary and Multi-agent Collaboration

As a typical interdisciplinary field, artificial intelligence naturally faces complex challenges from computer science, brain science, psychology, information science, education, and other disciplines. If artificial intelligence+education wants to achieve a qualitative breakthrough, it must vigorously promote interdisciplinary research and create new methods, new paradigms, and new concepts. At the same time, it is necessary to overcome difficulties through the establishment of a multi-agent collaborative mechanism, fully mobilize the enthusiasm of governments, universities, scientific research institutions, enterprises, and other parties, with the goal of promoting research and practical work on artificial intelligence+education, to create a new ecological escort for the deep integration and development of artificial intelligence+education.

5. Conclusion

The integration of artificial intelligence and education has accumulated many achievements. The establishment of Internet plus and learning society in China, as well as the reality and demand of educational innovation and development, put forward higher requirements for the deep integration of AI and college education in China. The development of deep integration of education and artificial intelligence is not an unconditional and simple addition. Only by mastering the norms in the deep integration of artificial intelligence technology and education can the promotion of technology to education be maximized. Therefore, in the process of promoting the deep integration of artificial intelligence and education, it is necessary to adhere to the essence of education, take education as the core, continuously carry out reform and innovation, create an excellent guarantee system, and clarify the systematic and scientific education goals in order to carry out efficient management, allow the deep integration of artificial intelligence and education in an orderly and scientific manner, and provide a strong impetus for the reform and development of higher education in the new era.

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