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Research on the impact and strategy of integrating artificial intelligence technology into the development of university education

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Abstract: *In recent years, artificial intelligence has not only had a greater impact on people's lives, but has also revolutionized our education system and provided a direction of teaching reform for traditional teaching. The integration of advanced artificial intelligence technology into college teaching has become the mainstream of the times. This paper firstly outlines the current situation and development trend of AI college education research at home and abroad, cites the application of AI in college education, and makes a case study of Shanghai Jiaotong University classroom, and finally puts forward the current problems and corresponding countermeasures. We hope to be able to relevant research to promote the reform of college teaching with advanced national artificial intelligence technology, and the contribution to the development of college education in China.*

Keywords: *Artificial Intelligence; College Education; Educational Development*

1. Introduction

In today's society, artificial intelligence technology has become the frontier technology of the fourth industrial revolution, which has an impact on various kinds of people's work and life. In particular, it has provided a new direction of teaching and learning for the traditional teaching model. 2017 saw the development of AI written into the government work report for the first time by the Chinese government. 2018 saw the Ministry of Education hold a press conference at Zhejiang University to introduce and interpret the Action Plan for Artificial Intelligence Innovation in Higher Education. 2019 saw UNESCO host the Artificial Intelligence and Education Conference in China, which set out the Artificial intelligence education in 2035 education goals.

In recent years, the country to help education to strengthen the country, science and education to promote the change of education itself, to train more composite talents, the use of artificial intelligence in college education application to carry out, the era of teaching and learning is undergoing rapid changes, the integration of artificial intelligence and education or will become a major driving force of education reform.

2. Current status and development trend of domestic and international research

2.1 Current status of domestic research

As of the end of June 2022, there were 283 papers on the China Knowledge Network on the topic of "Artificial Intelligence in Higher Education", including 228 papers in academic journals.

Domestic research involving AI in college education is generally on the development and practice of AI in college education, AI-enabled innovation transformation in college education, and research and exploration of methods for integrating AI in college education. Yu Gao (2020) in "Big Data + Artificial Intelligence": the necessary path for informatization of college education", based on the development background of big data and artificial intelligence, analyzed the current situation of colleges and universities in the process of realizing informatization, and combined with the actual experience of education technology development, proposed a reliable path for the development of artificial intelligence

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college education. Hu, Yuanliang Li, Yi Zhou and others (2018) took the education centre of Shanghai Jiaotong University as an example, and proposed the specific functional positioning of each of the three brothers, namely technology supplier, technology user and technology evaluator, and suggested that the education management department of universities use AI technology for the management and analysis of student information data. Liang Song, Lai Jinhui (2018) put forward a roadmap for the construction of "AI+" in university education on the current situation of AI development in China, as well as suggested promoting the integration of school-enterprise industry and education to accelerate the cultivation of AI talents. Yao Tianchong and Yang Shizhao (2021) reviewed the development process and history of AI education, summarized the current problems in AI education, and proposed a reference path for the future development of AI education in liberal arts.

2.2 Status of research abroad

Foreign countries are also focusing on the innovation of artificial intelligence in education as opposed to domestic nes, promoting the development of the education industry and economy through high technology. As early as the beginning of the 21st century, the US Department of Education conducted a study on the involvement of technology and information in education, which concluded that electronic information technology could enable teachers and students on campus to perform their tasks more efficiently, increase efficiency and reduce the occurrence of problems. In China, there are 127 articles on the topic of "Artificial Intelligence Education", including 116 academic journal articles.Shin Seungki (2019) Designing a pedagogical framework and cognitive learning environment for AI education through computational thinking based on existing AI technologies. Pat Langley (2019) identifies common AI pedagogy problems and proposes alternative principles for curriculum application; Chris D (2016) emphasises the profound changes in education brought about by AI, meaning a comprehensive change in educational efficiency and paradigm, rather than a 'patching' of the education system.

2.3 Development trends

The birth of the computer in the mid-19th century marked the dawn of the AI era. the 21st century is a new round of transformation and upgrading of the high-tech industry, moving from the original information age to the artificial intelligence age. The change in the information age means that traditional teaching methods for learning knowledge need to change and knowledge is being devalued. The intellectuals trained under traditional education can hardly match the needs of the new era. The core force in cultivating talents is university education, and more and more university education is now introducing artificial intelligence to intervene in teaching. For example, through AI big data analysis, analysis of students' strengths and weaknesses, to provide the development of appropriate and exclusive learning plans, and education will be more personalised, the development of artificial intelligence, to bring better opportunities for the development of education. Students in China, through the Internet, can study the courses of world-renowned schools such as Oxford and Cambridge without leaving the school, and learn on their own initiative according to their needs.

The advent of the era of artificial intelligence means that education policies, university professional settings, teaching methods, teaching evaluation systems and talent training plans need to be adjusted, combined with high technology, transformation and upgrading. With the addition of artificial intelligence, higher education will definitely usher in the era of great changes, achieve better development of K12 and higher education, and rapidly cultivate emerging power and knowledge talents in the context of artificial intelligence for China.

3. Application of artificial intelligence in university education

3.1 Smart Campus

The development of the internet in recent years has made higher education campuses full of technology and has improved the work of teachers and students to a greater extent. Teachers are able to take attendance through artificial intelligence, greatly reducing some of the tedious steps in class and increasing efficiency. In addition, for each class assignment and exam, AI can analyse each student's performance and provide personalised teaching tools and analysis of student learning. Students can use AI devices to conduct relevant experiments, expand their access to knowledge and research and innovation.

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Higher education classrooms are also equipped with multiple projection and lab equipment to encourage collaborative and cooperative learning and research between students and teachers. Artificial intelligence tools such as face recognition and emotion computing are used in the classroom to analyse teachers' teaching behavioural data to understand the realities of classroom teaching. Behavioural data analysis of students' facial expressions is carried out to capture their classroom listening.

3.2 Personalised learning

With the emergence of artificial intelligence teaching, Internet online education has gradually become commonplace, promoting the personalisation of education. Artificial intelligence teaching effectively solves the limitations of teaching space and time, students can study anywhere, the environment is not limited to the original single classroom, and can choose a variety of courses to study according to the needs of students, to achieve personalised education.

3.3 Changing the way research is done

Teaching assessment and administration in higher education is significantly facilitated with the help of artificial intelligence, thus allowing teachers and students more time to spend on research and innovation. Artificial intelligence can perform data collation, text analysis and other pre-research preparations, while researchers can devote more time and energy to writing academic papers and more complex scientific experiments. With the further development of AI in the field of academic research, research learning will gradually break down the barriers of the original disciplines, and research innovation will become the main problem of scientific research, making it more efficient and flexible. Artificial intelligence will gradually replace the original complicated simulations and calculations, and research learning will become more focused on the efficiency and innovation of research.

4. Case Study - Shanghai Jiao Tong University's Artificial Intelligence-based School-Enterprise Course Construction

The Innovation Centre of Shanghai Jiao Tong University is the first batch of dual-innovation demonstration experimental sites in China. Since its establishment in 2017, it has offered more than 60 university-enterprise cooperation courses and established joint innovation centres with several leading companies in the AI industry, jointly training advanced talents in AI and injecting fresh energy into the AI industry in China. For example, in the context of Shanghai Jiao Tong University's vigorous development of new engineering disciplines, the University has actively promoted the concept of "enterprise engineers on campus" and developed an elective course on "Artificial Intelligence Interaction Technology" with KDXUNFE, an advanced artificial intelligence company in China. Relying on the advanced voice technology of KU Xunfei, the course teaches real-time voice interaction and other artificial intelligence knowledge. Based on the programming language Python and the Raspberry Pi development board, as well as the learning of the operating system Linux architecture, students will be able to master the programming language Python and participate in the development of voice interaction, the application of Http protocols and streaming media, as well as the practice of IoT-related technologies. The AI Interactive Technologies elective course mainly consists of writing in Python, introducing the pyaudio module to achieve sound collection and projection, calling enterprise modules and Xunfei interfaces to teach students to complete real-time voice conversion, voice translation and other functions. This is further built upon by learning about text conversion techniques and controlling online data projection. At the end of the course, students will be required to design an intelligent voice chatbot based on a smart speaker development kit.

Enterprise mentors and Jiaotong University teachers jointly guide students in development, interacting in real time and answering questions together, benefiting all three parties. On the one hand, the enterprise mentors can give feedback to the enterprise headquarters based on the questions raised by the students and their feelings about the development and use, and improve the AI products according to the user needs of the social survey; secondly, the university teachers can be inspired by the scientific research in the process of communicating with the enterprise mentors, deepen their understanding of AI in the speech segment, increase their scientific research resume, and develop new AI products together with the enterprise experts in the laboratory; students On the other hand, they can be exposed to the development of AI products in advance, deepen their mastery of Python speech and Linux operating systems through actual cases and their own hands-on participation, learn while developing, and cooperate with teachers and students to develop custom AI voice chat products.

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In addition, the Education Technology Centre of Shanghai Jiaotong University has set up a number of "smart classrooms" from the actual needs, bringing artificial intelligence into the classroom, automatic attendance, roll call and random testing, and other functions to reduce the number of complicated steps in the classroom, and introducing advanced equipment such as cloud recording and wireless screen casting to facilitate teaching and provide convenience for teachers and students. The education centre will provide real-time feedback to the manufacturer through the problems and demands encountered in the classes, which will promote the replacement and upgrading of AI education products and the healthy development of AI education. The rest of the universities can jointly learn from the arrangement and setting of the AI curriculum of Shanghai Jiao Tong University, innovate the classroom teaching methods and introduce corporate tutors for teaching, so that students can better participate in the operational AI openness. Students can create exclusive laddered practical AI projects according to their perceived difficulty level.

5. Problems with AI education

5.1 There is no first class subject in the university teaching system at the moment

Artificial intelligence has become a key factor in the international competition in terms of technological level, and the training of artificial intelligence professionals is again of paramount importance. In terms of discipline construction, AI is an extremely important development discipline abroad, especially in developed countries such as the UK and the US. In contrast, in China, artificial intelligence is more scattered in the first-level discipline system of computer, automation and other disciplines, is the second-level discipline under these disciplines, and does not form an exclusive first-level discipline. As a second-level discipline, many colleges and universities involved in artificial intelligence courses are few and far between, more scattered, for the cultivation of artificial intelligence field talent is extremely unfavorable. The development of high-tech in China is in urgent need of talents in the field of artificial intelligence, in this case, there will be polarisation - the demand for talents is not proportional to the output, resulting in the widespread phenomenon of high start and low level, and so on, will seriously affect the development of China's artificial intelligence field, so the artificial intelligence The establishment of artificial intelligence as an exclusive first-level discipline is a long way off, but it is also a matter of urgency.

5.2 Lack of a unified authoritative textbook on artificial intelligence in higher education curricula

Combined with the current situation, the lack of unified teaching materials for artificial intelligence is one of the main problems in the construction of artificial intelligence majors at present. As an emerging discipline, artificial intelligence has a short history of development and is mostly a sub-discipline of some first-level disciplines, which are more scattered and do not have official unified textbooks, and need to integrate the knowledge of each first-level discipline to achieve the comprehensiveness of the textbooks. At the same time, it is also important to keep up with the changes in teaching materials, as the times are rapidly developing and changing, and there is a "lag" in the compilation of teaching materials in China, resulting in knowledge not being updated in real time, and the knowledge taught to students is not advanced.

5.3 Faculty for artificial intelligence is relatively lacking

In addition to education and discipline construction, for colleges and universities, the lack of teachers is also a key element that restricts the training of artificial intelligence talents. According to relevant statistics, in 2022 the country has carried out artificial intelligence education in nearly 500 universities, but the number of professional teachers is inversely proportional to the number of universities. The reasons for this phenomenon are broadly divided into two points. On the one hand, AI education has just started in China, lacking well-qualified scholars and experts, universities cannot provide high-quality teaching evenly, and even many AI professional university teachers only delve into theoretical knowledge, and do not master for practical exercises, which eventually leads to teaching students who are also unable to better apply the theory in practice and lack practical training. On the other hand, the rapid development of Baidu and other domestic technology enterprises, also in urgent need of artificial intelligence talents, enterprises give much higher salary treatment than college teachers, resulting in a large number of talents into high-paid enterprises, while college teachers positions are not asked for, the situation of the scales falling on one side.

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5.4 Poorly equipped artificial intelligence laboratories

At present, there are fewer relevant chips and components within the artificial intelligence laboratories of China's domestic universities, and the accuracy of sensors is low, which restricts the progress of training students in universities. According to relevant reports, most of the high-end chip business is directly monopolised by international AI head enterprises such as Nvidia and Intel, coupled with continuous mergers and acquisitions between major manufacturers in recent years, resulting in advanced technologies in the field of AI being mastered by western countries, resulting in a monopoly at the technical level. The monopoly is particularly prominent in experimental equipment, high-end chips, systems and software interfaces.

In addition China's teaching process of machine general open source algorithms is not comprehensive enough and the training of talents is stagnant. Although the number of papers in AI in China has grown significantly in recent years, the innovation of the papers is hampered by the imperfection of the equipment, which does not allow too much research to be done. The top papers and theoretical innovations in the field are still dominated by developed countries such as the UK and the US.

6. Countermeasures to the problem of artificial intelligence education

6.1 Promote the development of first-class disciplines in the field of artificial intelligence

The discipline of Artificial Intelligence covers a wide range of subjects and is currently recognised as one of the most influential. The career path of this talent includes almost all contemporary fields, and the development of the discipline of Artificial Intelligence can simultaneously promote the development of disciplines such as science, technology and medicine. The Ministry of Education should actively promote the construction of a first-level discipline in the field of artificial intelligence, and improve the distribution of artificial intelligence disciplines. At present, there are 36 undergraduate schools that have formally approved the major of "Intelligent Science and Technology", and 79 postgraduate majors in related fields. In China Knowledge Network, 3.5% of the dissertations were searched on the theme of "intelligence", far exceeding the average of 0.9% for the remaining 111 first-level disciplines. The layout of these disciplines and theses provide the foundation and guarantee for the construction of the first-level discipline of artificial intelligence.

6.2 Compile a unified textbook on artificial intelligence as soon as possible

Textbooks are the basis of teaching. To help cultivate AI professionals and facilitate the development of teaching in China's university organisations, it is imperative to publish an authoritative textbook and innovate the education model. In the process of compiling the textbook, we can introduce the power of high-tech enterprises to participate in it, so as to combine industry and education, combine practice to increase the cases of the textbook, and guide enterprises to participate in the development of textbooks and practical training in universities. In addition, most of the teaching materials in domestic universities are imported from abroad, and there are inevitably deviations in the translation process, and some of them are not adapted to the teaching system of our universities. Therefore, there is an urgent need to clarify the unique curriculum system of AI teaching, and it is of utmost importance that a unified model textbook is issued by domestic authorities. Artificial intelligence is a new and evolving discipline, and the real-time nature of teaching materials and keeping up with the times is one of the difficulties that cannot be ignored.

6.3 Importing foreign and corporate talent into universities

The lack of human resources in the field of artificial intelligence is currently one of the common international phenomena. The solution to this problem is the exchange of cross-cutting faculty, pooling the strengths of all parties, transnational, interdisciplinary, university-enterprise joint university rush oh ah Yu, build a complete teaching system. On the one hand, the government has increased its talent policy, universities can introduce talents from abroad in the field of artificial intelligence, hire professors to teach in universities; on the other hand, seek cooperation with enterprises, enterprise talents into universities to teach, teaching real practical application-oriented artificial intelligence algorithms, industry-teaching combination, this approach is generally recognized in the international, for example, Harvard University, Stanford University will specifically hire Google and other artificial intelligence For example, Harvard University and Stanford University will hire scientists and experts from leading companies in the field

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of artificial intelligence to work in universities to enhance students' practical training, transform technology and experience into teaching resources, and train talents in a more comprehensive and professional way.

6.4 Cooperation between universities and enterprises in developing domestic chips

In March 2019, the seventh meeting of the Central Committee for Comprehensively Deepening Reform deliberated and adopted the Guidance on Promoting the Deep Integration of Artificial Intelligence and the Real Economy, pointing out that society now needs talents to drive AI technology breakthroughs and creative applications. Therefore, the efficient construction of AI experimental teaching and practical training environment in universities can solve the problem. on the issue of AI chips, chip companies can join hands with research teams from top universities such as Tsinghua and Peking University to jointly develop domestic chips belonging to China. Jointly develop software tools for the full stack from the underlying driver environment to the upper layer model conversion, etc. For example, Kunlun Core Technology, a pioneer in the field of artificial intelligence chips in China, has jointly developed the Kunlun Core 2 generation with the new generation architecture XPU-R, which will be mass produced in 2021 and can be adapted to artificial intelligence applications and various algorithms such as VGGNet, GoogleNet, R-CNN, LSTM, YOLO, FCN, ResNet, U-Net, NMT, R-C3D and so on. C3D and other types of algorithms to build a common computing base. Secondly, enterprises and universities can also establish a shared deep learning experiment platform based on GPU-accelerated cloud services to enhance efficiency by unifying the hardware such as memory and CPU on the host host computer through a virtualization program to arrange and adjust it and distribute it to the rest of the virtual machines for use. Do multiple experimenters on virtual machines using the same physical configuration to conduct experiments without interfering with each other and independent of each other.

7. Conclusions

The advent of the era of artificial intelligence has revolutionised our education system with the development of new technologies and products that have brought development opportunities to our education and teaching. For example, smart campuses, smart attendance to increase classroom efficiency, and the use of artificial intelligence tools such as face recognition and emotion computing to analyse teachers' teaching behavioural data to understand the true state of classroom teaching. Students' facial expressions are analysed for behavioural data to understand course mastery; students can use online resources to learn from anywhere, in an environment that is not limited to an otherwise single classroom, and can choose from a variety of courses to learn according to their needs, allowing for quick access to knowledge and facilitating independent and personalised learning; AI can carry out data collation, text analysis and other scientific research Artificial intelligence can be used for data collation, text analysis and other pre-research preparation, and researchers can devote more time and energy to writing academic papers and more complex scientific experiments. However, in the process of promoting the application of AI education in universities, it should always be treated rationally, as there are still many unknown problems in AI education that need to be solved, such as the lack of a primary subject in the university teaching system, the lack of unified authoritative teaching materials for AI in the university teaching curriculum, the lack of teachers for AI, and the imperfect technical equipment for AI experiments. In line with the global tide of intelligent development, universities can promote the construction of a first-level discipline in the field of artificial intelligence, compile a unified teaching of artificial intelligence as soon as possible, introduce foreign and corporate talents to universities, and cooperate with universities and enterprises to develop domestic chips, so as to advance the teaching reform of universities with advanced domestic artificial intelligence technology and make greater contributions to the development of university education in China.

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References

[1] Yu Gao. "Big Data+Artificial Intelligence": A Necessary Path for the Informatization of Higher Education [J]. China Higher Education, 2020, (19): 59-61
[2] Long Xianzhong, Dai Annie. Artificial Intelligence+Education: A New Opportunity for the Reform of China's University Talent Training [J]. University Education Science, 2019 (04): 107-113
[3] Fang Bing, Hu Rendong. The Construction of Artificial Intelligence Colleges in Colleges and Universities in China: Motivation, Value and Philosophical Thinking [J]. China Distance Education, 2020, 41 (04): 19-25
[4] Wang Xinhong. "Artificial Intelligence+Ideological and Political Education": A New Mode of Ideological and Political Education in Colleges and Universities for the Future [J]. School Party Building and Ideological Education, 2021 (06): 79-81
[5] Li Haifeng, Miao Wensheng. Challenges and Countermeasures: Colleges and Universities Should Attach Importance to Value Judgment Education in the Age of Artificial Intelligence [J]. China Audio Visual Education, 2020 (02): 43-49
[6] Hu Peiran, Li Yuanliang, Zhou Yi, et al. Functional orientation of college education technology center in the era of artificial intelligence -- Take the education technology center of Shanghai Jiaotong University as an example [J]. Modern Education Technology, 2018, 28 (11): 67-72