



The Innovative Path of Intelligent Teaching in the Age of Artificial Intelligence

Ye Liu¹, Shuai Wang², Jun Liu²(✉), and Shaohui Qu²

¹ Chongqing College of Architecture and Technology, Chongqing, China

² Army Logistics Academy, Chongqing, China

ljqwxyszb@sdust.edu.cn, 1009624465@qq.com

Abstract. In order to promote the innovation and development of intelligent teaching in the era of artificial intelligence, colleges and universities actively make use of artificial intelligence technology, seize rare opportunities, effectively deal with challenges, adhere to the leadership of the Party, update ideas, do well in technology research and development, strengthen personnel training, which provides a solid practical foundation for the intelligent teaching of artificial intelligence in colleges and universities.

Keywords: Artificial intelligence · intelligent teaching in colleges and universities · innovation

1 Introduction

With the increasing growth of artificial intelligence, the application field of artificial intelligence is getting wider. Education is not only an important thrust of the development of artificial intelligence but also an important field of artificial intelligence application. In September 2018, the Ministry of Education issued *the Opinions on Deepening the Reform of Undergraduate Education and Teaching and Comprehensively Improving the Quality of Talent Training*, which pointed out that the new form of intelligent education should be actively explored [1]. To actively use artificial intelligence technology to promote intelligent teaching in colleges and universities is not only the general trend of the development of modern and intelligent education in China, but also the practical need to give full play to the important role of higher education as a key course to cultivate morality and talents in colleges and universities.

2 Artificial Intelligence Provides Innovative Opportunities for Intelligent Teaching in Institutions of Higher Learning

At present, artificial intelligence with a huge space for technological improvement has been able to preliminarily realize the “man-machine co-teaching”, “man-machine co-management” and “man-machine co-research”, which provides more reliable technical support for the realization of intelligent teaching in colleges and universities [2].

2.1 Provide Intelligent Methods to Grasp the Ideological Status of College Students

The purpose of higher education is to solve the contradiction, conflict and gap between college students' realistic thoughts and the requirements of national ideology. Therefore, a scientific and accurate grasp of the ideological status of college students is an important prerequisite for better courses in colleges and universities [3]. The use of artificial intelligence technology to collect statistics of college students' learning situation, family situation and ideological performance of political class before admission, scientific analysis of the big data obtained, and the information obtained from questionnaire survey and discussion of mutual corroboration and complement each other, are helpful to accurately understand and grasp the real ideological situation and practical needs of college students. In addition, the use of artificial intelligence technology can be real-time collection of college students' classroom learning performance and realistic ideological changes, accurate drawing of college students' ideological status dynamic chart, and effectively solve the technical problems of college students' dynamic ideological grasp.

2.2 Provide Intelligent Support for Educational Reform and Innovation in Institutions of Higher Learning

On the one hand, AI can help unleash the creative vitality of teachers in institutions of higher learning. At present, although AI is at the weak stage, it has been able to assist educators to complete a variety of tasks. The development and application of intelligent robots will liberate teachers of colleges and universities from daily, repetitive, mechanical and routine work, so that they can have more time for professional learning, ability improvement and creative teaching design, provide intelligent assistance for the creation of gold courses in colleges and universities, and fully release the creative vitality of teachers of colleges and universities. On the other hand, artificial intelligence can help to explore the teaching characteristics and laws of colleges and universities in the new era, and explore new teaching methods of colleges and universities [4]. The experience accumulation of teachers in colleges and universities is slow, and the peak of creation is short. The third generation of AI can break through the biological and social limitations of the creative vitality of teachers in colleges and universities. By learning the classroom teaching, teaching design and educational papers of teachers in colleges and universities, especially those of famous teachers, it can collect the talents of famous teachers and gather the wisdom of all students. To quickly complete the summary of the teaching characteristics of colleges and universities in the new era, so as to provide data support for timely exploration of new teaching methods of colleges and universities that adapt to the characteristics of the times.

2.3 Provide Wisdom Support for Personalized Teaching in Institutions of Higher Learning

Different from the knowledge education which emphasizes universality, the education in colleges and universities has the characteristics of politics and value, and emphasizes

individuation and individualized teaching, which is particularly important. In February 2020, the Ministry of Education issued the Regulations on *the Regulations on the Construction of Teachers for Ideological and Political Theory Courses in Colleges and Universities in the New Era*, which requires that full-time teachers in institutions of higher learning be approved in strict accordance with the teacher-student ratio of no less than 1:350 [5]. Even so, the number of teachers in institutions of higher learning is still relatively insufficient in the face of college students' abundant demand for education and teaching in institutions of higher learning. The non-biological nature and powerful computing and simulation functions of artificial intelligence can effectively solve the contradiction between supply and demand in institutions of higher learning. First, artificial intelligence can fill the "vacancy" and "absence" of teachers in universities and colleges. Intelligent robot teachers can answer college students' knowledge questions at any time all day long. Through deep learning, they can exchange ideas with college students to solve ideological doubts and relieve psychological discomfort, so as to ensure that college students can receive high-quality teaching in colleges and universities anytime and anywhere in special environments such as winter and summer holidays, practice and exercise. Second, artificial intelligence can assist in the development and implementation of personalized teaching. Relying on the intelligent system of intelligent classrooms in colleges and universities, using voice recognition, face recognition and intelligent algorithm technology, real-time collection, storage and analysis of college students' learning attitude, facial reaction, classroom performance and learning effect will be collected. Based on big data, accurate ideological "portrait" is drawn for each college student, and personalized teaching programs of colleges and universities are formulated accordingly. At the same time, to fill gaps based on artificial intelligence algorithm, timely push differentiated teaching content, and truly achieve individualized teaching without missing one person [6].

2.4 Provide an Intelligent Platform for Teaching Management Evaluation of Colleges and Universities

Based on big data technology and relying on intelligent classroom monitoring system, the teaching development of institutions of higher learning is recorded full-time and region-wide. Using big data to comprehensively analyze student response, classroom atmosphere, interaction frequency, etc., can realize the transformation of teaching management and evaluation in colleges and universities from qualitative analysis to qualitative and quantitative combination, and improve the scientific nature of teaching management and evaluation in colleges and universities [7]. Based on the intelligent monitoring system to record the performance of each student's classroom teaching activities, we can improve the accuracy of student evaluation and assessment by using big data to carry out the whole process, dynamic evaluation of college students, combined with the teacher's evaluation and complement of each other.

3 Artificial Intelligence Poses Serious Challenges to Intelligent Teaching in Colleges and Universities

Artificial intelligence technology is to imitate, assist, liberate, enhance and even replace human intelligence and mental work. The dual nature of science and technology application makes artificial intelligence provide innovation opportunities for wisdom teaching in colleges and universities, but also brings severe challenges.

3.1 The Dominant Position of Teachers in Institutions of Higher Learning is Weakened

The teachers of colleges and universities are the leaders of wisdom teaching in colleges and universities, as well as the planners, implementer and innovators of teaching in colleges and universities. However, with the deep integration of artificial intelligence technology and teaching in colleges and universities, the dominant position of teachers has suffered more and more impact, and there is even the possibility of alienation. Artificial intelligence robot teachers and intelligent education platforms will feed back teaching demand and teaching effect based on big data [8]. Teachers in colleges and universities are faced with strong external pressure to cater to AI and students' demands and feedbacks. The guiding function of teaching in colleges and universities is in internal conflict with catering to demand. The leading position of teachers in institutions of higher learning is at risk of being weakened. Artificial intelligence, as the assistant of teachers in colleges and universities, has a regulating effect on their professional development, ability shaping and teaching activities. And their self-planning, self-design and self-realization abilities are weakened.

3.2 The Dominant Position of College Students is Shaken

College students are the subject of teaching in institutions of higher learning, as well as the recipients, evaluators and feedbacks of teaching in institutions of higher learning. In the era of artificial intelligence, the information received by college students is increasingly dependent on the push of artificial intelligence. The flow based artificial intelligence algorithm leads to the easy immobilization, narrowing, fragmentation and meaningless of the information exposed to college students. The "cocoon room effect" makes it possible for college students to transfer the right of information choice, learning initiative and ideological shaping to artificial intelligence. It is becoming more and more difficult for college students to maintain their subjectivity.

3.3 Increased Risk of Teaching Safety

In the era of artificial intelligence, the teaching environment of colleges and universities is more open, more interactive and more mobile. In the teaching process, a large amount of data will be generated in real time. The preservation, transmission, use and other links of these data have the risk of leakage, and its security is greatly challenged. Colleges and universities are an important field of ideological struggle, and college students are

the key objects of ideological penetration by hostile forces. In the era of artificial intelligence, college students receive information through more diversified channels, and the ideological penetration of hostile forces is more convenient, accurate and hidden because of artificial intelligence technology, which poses a severe challenge to the ideological security of colleges and universities.

4 Inspiration of Artificial Intelligence Intelligent Teaching Based on Cloud Model

In recent years, artificial intelligence has made significant progress in the fields of image recognition, natural language processing, and become one of the important tools to promote economic and social development. The rapid development of machine learning technology is the main driving force behind the widespread application of artificial intelligence. Among them, deep learning is the most important representative branch of machine learning [9].

Uncertainty is a ubiquitous phenomenon in nature, which mainly includes two basic types, namely, randomness and fuzziness. Generally, probability theory is used to deal with stochastic problems, and fuzzy mathematics is used to deal with fuzzy problems. In the research of artificial intelligence teaching, an important entry point is to reveal the principles of human thinking, and the important carrier of human thinking is natural language, which contains a lot of uncertainty. By establishing the correlation between randomness and fuzziness, we further study the bidirectional cognitive process of natural language, resulting in an important model in cognitive physics, the cloud model, which is defined in the following form:

$$\mu : U \rightarrow [0, 1] \quad \forall x \in Ux \rightarrow \mu(x)$$

where x is referred to as cloud droplets, $\mu(x)$ is referred to as the degree of certainty, and the distribution of cloud droplets on the universe U is referred to as clouds. Generally, a cloud model is described using three digital features (Ex , En , He). Ex represents expectation, which is the mathematical expectation of the spatial distribution of cloud droplets in the universe; En represents entropy, which reflects the degree of dispersion of cloud droplets that can represent this qualitative concept; He represents hyperentropy, which is an uncertainty measure of entropy.

For the two tasks of qualitative and quantitative two-way cognition, there are two corresponding algorithms. One of them is the forward cloud generator algorithm, which realizes the conversion from qualitative concepts to quantitative samples. That is, the input of the algorithm is the three digital features of the cloud model, and the output is a specified number of data sample points. Due to the universality of Gaussian distribution, Gaussian cloud models have been widely used in cloud model algorithms. It can be seen as a pan Gaussian distribution formed after the expansion of the law of large numbers. Currently, Gaussian cloud models have been widely used in fields such as automatic control, image processing, and data mining.

5 Path Selection of Intelligent Teaching Innovation in Colleges and Universities in the Era of Artificial Intelligence

At present, the development of artificial intelligence changes quickly every day, and the application of artificial intelligence in education advances rapidly. In face of the breakthrough and subversion of artificial intelligence in the teaching of traditional institutions of higher learning, we should positively accept new technologies, actively adapt to new challenges, consciously cope with new changes, and embed intelligent wings in the teaching innovation and development of institutions of higher learning.

5.1 Organizational Path: Adhere to the Leadership of the Party

The application of artificial intelligence in colleges and universities has both technical and political requirements. Adhering to the leadership of the Party is the inherent requirement of the innovation and development of intelligent teaching in colleges and universities in the era of artificial intelligence [10]. We should adhere to the educational policy of the Party, adhere to the fundamental task of cultivating virtues and cultivating people, and ensure that artificial intelligence technology always serves the Party. On the one hand, it is necessary to strengthen the Party's organizational leadership and top-level design of the application of artificial intelligence in the teaching of colleges and universities, establish the political check and security review mechanism of the Party committee and competent departments on the application of artificial intelligence in the intelligent teaching of colleges and universities, effectively master the application process of artificial intelligence in the teaching of colleges and universities, and ensure that it is active, steady, safe and reliable. On the other hand, the will of the Party should be absorbed into the research and development of artificial intelligence. The application of AI in the teaching of colleges and universities is not only the development and innovative application of technology, but also has political attributes. Technological control should be used to ensure that AI always implements the will of the Party and embodies the ideology of Marxism. For example, it is necessary to deeply involve in the programming of artificial intelligence algorithm, scientifically set the value ascribe to the teaching of colleges and universities, and build a good ecology of intelligent push of teaching information in colleges and universities in the new era.

5.2 Ideological Path: Update Ideological Concepts

Although the application of artificial intelligence in wisdom teaching in colleges and universities is limited by many conditions such as political, value and emotional requirements, the trend of artificial intelligence cannot be stopped. When AI technology meets the teaching of colleges and universities, whether it will spark wisdom or miss it, the key lies in whether the ideas can keep up with the times. The teaching of institutions of higher learning should catch up, promote the leapfrog development from the network era to the era of artificial intelligence, and give full play to the due role of the key courses of cultivating virtues and talents. No matter the teaching leaders, organizers or implementer of colleges and universities, they should update their ideas, further emancipate

their minds, set up dialectical thinking, fully recognize the application prospect of artificial intelligence in the teaching of colleges and universities, actively act and adapt, boldly innovate, and overcome the bad tendency of lazy act and slow act. To boldly try and carry out experiments in a number of colleges and universities, refine the “experimental field” of artificial intelligence application in intelligent teaching of colleges and universities, discover and solve new situations and new problems, actively explore the characteristics and rules, accumulate experience and sum up practices, further optimize intelligent algorithm based on the application of big data, and lay a practical foundation for large-scale promotion of artificial intelligence application.

5.3 Technology Path: Do Well in Technology Research and Development

According to *China's New Generation Artificial Intelligence Development Report 2019*, China leads the world in the number of AI papers issued and ranks the second in the world in the number of AI enterprises. The high level of AI technology development in China has provided a solid material foundation and technical support for its application in universities and colleges. China's technological advantages of artificial intelligence should be transformed into innovative advantages of teaching in colleges and universities to realize the innovative development of intelligent teaching in colleges and universities in the new era. On the one hand, we should make full use of transforming the existing technology platform of AI education application. Some Chinese AI enterprises have been deep in the field of education for many years, and have developed mature AI education application platforms. Based on this, they can upgrade to meet the technological needs of AI in teaching institutions of higher learning as soon as possible. On the other hand, we should strengthen cooperation with AI enterprises to develop new intelligent platforms and manufacture intelligent equipment. Choose enterprises with strong technical strength, safety and reliability, establish solid cooperative relations, strengthen cooperation in the development of intelligent environment, intelligent robot teaching assistants, etc., to provide systematic and safe intelligent solutions for teaching in colleges and universities.

5.4 Talent Path: Improve Ability and Quality

In January 2018, the CPC Central Committee and The State Council issued *Opinions on Comprehensively Deepening the reform of the Construction of teachers in the New Era*, which pointed out in the “objectives and tasks” that teachers should take the initiative to adapt to new technological changes such as informatization and artificial intelligence, and actively and effectively carry out education and teaching. Therefore, we should focus on the new requirements of the artificial intelligence era on the ability and quality of teachers in institutions of higher learning, explore new growth points for the improvement of teaching ability in institutions of higher learning, through centralized training, experience exchange, competitions to promote training, practice refining and other ways. Enhance teachers' “cognitive power” to use artificial intelligence to obtain high quality teaching resources, “judgment” to use big data to dynamically analyze the ideological status of college students, “creativity” to design excellent courses of political theory based on intelligent platform, “coordination power” to carry out political theory course teaching

with man-machine cooperation. To cultivate teachers of colleges and universities who understand artificial intelligence technology and provide strong talent support for the innovation and development of intelligent teaching in colleges and universities in the era of artificial intelligence.

6 Conclusions

Artificial intelligence is an interdisciplinary discipline that can be applied in multiple fields. AI intelligence teaching is not entirely about teaching students how to use algorithms to build models, but more importantly, it is about inspiring students to use these algorithms and models to solve practical problems, and to be able to think independently in actual exercises. Artificial intelligence is a rapidly developing discipline. The emergence of new technologies and methods has brought challenges to the teaching of artificial intelligence. In future teaching, we will consider how to update teaching content with the times, so that students can firmly grasp the foundation and keep pace with cutting-edge knowledge.

References

1. Lu Yong. Research on Online Teaching Practice of Ideological and Political Course in Colleges Based on Virtual Simulation Technology[J]. *China University Teaching*, 2021(4):80.
2. Song Zhuanmao, Liu Ronghua. Operational Analysis of “Gender First Degree” in Curriculum Teaching[J]. *Educational Theory and Practice*, 2021 (12): 49.
3. Zhu Liming, Song Naiqing, Huang Jin, et al. Deep Learning under the Core Concept of STEAM Education: Rationale, Framework and Path [J]. *Chinese Journal of Education*, 2022 (1): 70.
4. Jin Xiaomei, Gao Qianqian, Yin Jing. Research on Teaching Paradigm Reform of “Student Development as the Center” under the Background of New Liberal Arts [J]. *The Economist*, 2022 (2): 186.
5. Ding Hongming. Discussion on “Learning-centered” Teaching Design under Core Accomplishment -- Taking “Transformer” Teaching as an Example [J]. *Physics Teaching*, 2019 (8): 14.
6. Wang Shaofei. *Classroom Evaluation to Promote Learning* [M]. Shanghai: East China Normal University Press, 2018:19.
7. New Knowledge View: Reconstructing Teaching and Learning for Intelligent Age[J]. *Journal of East China Normal University*, 2019 (5): 38–55.
8. Zhang Fan. Key Elements and Implementation Approaches of Curriculum Ideological and Political Construction [J]. *Beijing Education · Higher Education*, 2022 (2): 62–64.
9. Zeng Jianchao, Wu Shuqin, Zhang Chunxiu. Virtual Teaching and Research Office: Innovation of Grassroots teaching and research Organizations in Colleges and Universities[J]. *China University Teaching*, 2020 (11): 64–69.
10. Sang Xinmin, Jia Yimin, Jiao Jianli, Xie Yangbin, Hu Yiyuan. Theoretical and practical exploration on the Construction of virtual Teaching and Research Section in universities[J]. *China Higher Education Research*, 2021 (11): 91–97.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

