

# Research on the Multimodal Learning Path of thought and Politics in Medical Education Curriculum under the Enabling of Artificial Intelligence Technology

Liang Ying<sup>1</sup>, Zhouyang Chen<sup>2</sup>, Rongyang Zhou<sup>2</sup> and Hemin Zhang<sup>1,\*</sup>

<sup>1</sup> Department of Student Affairs Management, Renji College, Wenzhou Medical University, Wenzhou, China

<sup>2</sup> The First School of Medical, Wenzhou Medical University, Wenzhou, China

\* Corresponding author: Hemin Zhang (Email: 358626601@qq.com)

---

**Abstract:** The innovation of artificial intelligence technology has promoted the revolution of multi-industries, and the combination of medical education courses and artificial intelligence technology has been deepened. mixed reality and other technologies can help the input and output of multimodal information in the process of teaching and build a multimodal learning path. This paper makes an in-depth analysis of the current situation of higher medical education in colleges and universities, the application of artificial intelligence technology in medical teaching activities, and the related research of multimodal teaching interaction model theory. this paper discusses the multimodal learning path of thought and politics of medical education curriculum under the enabling of artificial intelligence technology, hoping to provide useful guidance and reference for related research.

**Keywords:** Artificial Intelligence Technology; Medical Education; Curriculum Thought and Politics; Multimodal Learning Path.

---

## 1. Introduction

The purpose of medical education course is to cultivate medical students' theoretical knowledge and practical skills so that they can become excellent doctors. The purpose of ideological and political course is to cultivate students' humanistic accomplishment and sense of social responsibility, so that they can become talents with noble moral character and rational thinking. However, in the current medical education, curriculum ideology and politics have the following problems:

1. The content of ideological and political course is single. The ideological and political courses in most medical colleges are mainly based on national policy, ethics and morality, and there is a lack of ideological and political courses aimed at the characteristics of medical majors.

2. Lack of effectiveness of ideological and political education. The teaching methods of ideological and political courses in most medical colleges are outdated and single, without keeping pace with the times and lack of innovation, so that ideological and political education cannot really help the growth of students.

This study intends to excavate and analyze the research papers related to the current situation of curriculum thought and politics of higher medical education in colleges and universities, the application of artificial intelligence technology in medical teaching activities, and the theory of multimodal teaching interaction model. sort out the current research situation, research hotspots and shortcomings, so as to provide decision-making reference for the further development of curriculum ideology and politics in the field of medical education. It is hoped that it can effectively promote the co-construction and sharing of teaching resources and the interactive exchange of teaching subjects, and the purpose is to enhance the methods and means of ideological and political thinking in higher medical education

so as to cultivate the humanistic literacy of medical students. it has important guiding significance and exploration value for colleges and universities to train medical talents in the future.

## 2. A Study on the Present Situation of Ideology and Politics of Higher Medical Education Courses in Colleges and Universities

The Ministry of Education of the people's Republic of China issued the implementation outline of the Project for improving the quality of ideological and political work in Colleges and Universities in December 2017, which included the concept of curriculum ideology and politics in the documents of the Ministry of Education for the first time. Colleges and universities across the country are required to vigorously promote classroom teaching reform aimed at curriculum ideology and politics. It has been a mature adaptive stage for the ideological and political construction of medical curriculum since 2020. In 2020, the Ministry of Education issued the guiding outline of Curriculum ideological and political Construction in Colleges and Universities, proposing "innovative teaching models to promote the application of modern information technology in curriculum ideological and political teaching". Relying on the support of information technology, the majority of medical colleges and universities continue to integrate teaching methods such as "pbl", "flipped classroom" and "online teaching" into curriculum ideological and political construction. At the same time, key words such as "new medicine" and "satisfaction" appear for the first time, which fully reflects the omni-directional integration of ideological and political content in medical education and the construction of medical education curriculum in line with the development of the times.

Dong Weiren [1] and others put forward the concept of mixed teaching (guidance) and learning through the method of experience summary, following the three principles of timeliness, suitability and moderation, and appropriately carrying out social practice through multi-dimensional and multi-path integration to realize the ideological and political thought and politics of medical curriculum. at the same time, a reference table for the design strategy of ideological and political preparation of medical curriculum is designed. Taking the subject of biochemistry as an example. Wu Wei [2], through the methods of case study and experience summary, introduced the curriculum thought and politics in "the structure and function of protein", and pointed out that the explicit thought and politics discussed on a case-by-case basis is prone to the problem of "too much preaching but not enough reasoning." it is proposed that it should be based on professional curriculum knowledge, and after a thorough explanation of the knowledge points, the ideological and political value will naturally become clear. Taking medical microbiology as an example. Liu Lijun [3] summarized the ideological and political elements in the course, put forward the ideological and political elements that should be integrated into the medical microbiology course, and pointed out that the appropriate ideological and political entry point should be selected in the course and organically combined with the classroom content. Wang Daliang [4] and others proposed that we should focus on planning curriculum ideological and political design, and take different forms to effectively integrate ideological and political materials into the curriculum, such as story teaching, case analysis, topic discussion, practical teaching, hot focus and so on.

To sum up, with the innovative development of higher medical curriculum ideology and politics in colleges and universities in recent years, the state has made great efforts to promote the development of curriculum ideology and politics, and the development trend is obvious. the teaching reform aims at curriculum ideology and politics, and integrates curriculum ideological and political construction into a variety of teaching methods. and promote the application of modern information technology in curriculum ideology and politics. Through the analysis of the literature, the researchers mainly through the experience summary and qualitative analysis, combined with the case study method to explain the current medical college curriculum ideological and political integration.

### **3. Research on the Theory of Multimodal Teaching interaction Model**

Multimodal teaching is a concept put forward at the beginning of the 21st century. It is an iteration of multimedia teaching in the 1980s and 1990s. It is the product of big data and intelligent technology. It emphasizes the role of intelligent technology into multimodal information in the teaching process, that is, multimodal can make sensory information into a variety of symbol coding, and provides opportunities to understand information through different ways. For example, visual media and language media do not simply represent alternatives to the same things, but work together in the process of information transmission. In recent years, with the continuous development and extensive application of big data, artificial intelligence and computer science, multimodal teaching has been widely used in all kinds of school education, including medical education. The

so-called multimodal teaching means that teachers use teaching materials, digital teaching resources and visual, linguistic and other modal information presented by sensors, intelligent video, computer monitors and so on in classroom teaching. to analyze and help students' development and improve their literacy of information acquisition. At present, the multimodal information involved in multimodal teaching mainly includes the multimodal information of teachers, the multimodal information of teaching equipment and the mixed multimodal information of teachers and teaching equipment.

Lu Jijian [5] and others believe that technologies such as mixed reality are building a new teaching method of "multi-mode + man-machine cooperation". With the help of intelligent technology, the teaching process forms visual, auditory, tactile and other multimodal interactive feedback paths, which promotes the input and output of multimodal information and improves the teaching effect. Wang Tongju [6] and others specifically analyzed the application of head-wearing, desktop, handheld and other virtual reality technology in teaching, which can enhance the sense of reality, experience and immersion in the learning process, so as to promote the reform of traditional teaching methods. But at the same time, it is pointed out that there are some problems in virtual reality teaching, such as shortage of teaching resources, emphasis on form over content, difficulty in popularization and so on.

Through literature research, exploratory research, experience summary and simulation, the researchers creatively put forward a multimodal teaching interaction model, which integrates "seeing-hearing-speaking" multi-angles and multi-senses to improve the effectiveness of the interaction process. The advantage of multimodal teaching interaction model is that it can carry out customized teaching according to students' individual needs and learning habits, and provide personalized learning path and content. We can also adjust the teaching strategies in real time and provide targeted guidance and assistance through the analysis and feedback of the learning process. In this way, students can participate in learning more actively and improve their learning effect and efficiency. Generally speaking, the emergence of multimodal teaching interaction model has brought many innovations and changes in the field of education. It makes full use of artificial intelligence and interaction, provides a richer, intuitive and personalized learning experience, promotes learners' active participation and in-depth thinking, and improves learning effect and efficiency.

### **4. Application of Artificial Intelligence Technology in Medical Teaching Activities**

At present, the higher medical routine education in colleges and universities is mainly composed of "three-stage teaching", that is, basic theory learning, clinical courses and recess practice and production practice. With the development of science and technology and the development of big data and artificial intelligence, the problems of lack of emergency response capacity, lack of multi-dimensional integration concept and unequal distribution of medical education resources in the personnel training of health industry in China have been gradually exposed. The development of new technologies such as artificial intelligence plays an irreplaceable role in promoting the digital transformation of

medical education resources, overcoming the shortcomings of traditional medical education, promoting the modernization of medical education, intelligent management system and sharing of educational resources.

However, according to the questionnaire, 65.08% of medical students do not know AI-related knowledge (71.43% of clinical medicine majors); 78.98% of students think that AI will not replace doctors, and 82.37% of students do not think that AI will affect their career choice in the future [7]. The above statistical results show that medical colleges and universities have some deficiencies in AI general teaching, medical students are not familiar with the application of artificial intelligence in the medical field, and have not correctly realized the importance of artificial intelligence. Medical colleges and universities still carry out medical teaching step by step, and have not effectively carried out the popularization of artificial intelligence and medical knowledge.

Through the method of comparative research, Yue Mei [8] and others compared the application of artificial intelligence in the field of medical education at home and abroad, and combined with the current situation of education in our country, they pointed out that while seeing a great breakthrough in artificial intelligence medicine, we should also realize that most of the medical teaching in our country is still lagging behind and boring, and put forward that medical students' education can liberate teachers from complicated homework grades with the help of artificial intelligence technology. Carry out individualized teaching to students. By comparing the traditional medical education with the combination of artificial intelligence and traditional medical education. Kang Wei [9] pointed out that the mode of traditional medical master's doctoral education lags behind, only for the deepening of undergraduate knowledge, while artificial intelligence technology can realize personalized teaching. help to obtain advanced teaching resources, massive data processing and adaptive learning. Through literature collection and analysis, combined with the current situation of medical education in China. Li Honghao [10] pointed out that medical educators in China are lack of understanding of artificial intelligence technology, and there is a big technical bottleneck, so it is difficult to realize the application of artificial intelligence technology in medical education. it is pointed out that next, we should develop the core equipment of artificial intelligence technology, formulate the top-level design of intelligent medical education, and promote the application of artificial intelligence technology in an appropriate range.

Through the analysis of 92 articles about the application of artificial intelligence in medical education in CNKI, the researchers mainly discuss and summarize the problems existing in the application of artificial intelligence technology in medical education through literature research, comparative research and experience summary, and point out the problems that artificial intelligence is not widely used in control through questionnaire and on-the-spot investigation. The interdisciplinary research method is used to analyze the development trend of artificial intelligence in the field of medical education, to design and formulate medical education plans for artificial intelligence enabling, to promote the integration of artificial intelligence into medical education, to realize the adaptive learning of medical educations, to implement personalized teaching, and to promote the development of digital and intelligent education. However, at

present, artificial intelligence is not well integrated into curriculum thought and politics.

## **5. The Proposal of Multimodal Learning Path of Thought and Politics in Medical Education Curriculum under the Enabling of Artificial Intelligence Technology**

With the development of artificial intelligence technology and multimodal teaching model, this paper innovatively proposes the integration of medical education curriculum thought and politics and multimodal teaching model, and combines artificial intelligence technology with it. This paper puts forward a multi-modal learning path of medical education curriculum ideology and politics under artificial intelligence technology, that is, based on its own intelligent terminal function and relying on the hardware connection layer, the seamless interconnection and cooperation between a variety of software and hardware devices can be realized. Provide real immersive real-time learning experience and teaching result feedback for teaching subjects. Students can interact with teachers efficiently through the hardware layer, analysis layer, application layer and feedback layer of the model, and feel the characteristics of the model, such as immersion, cooperation, feedback, tacit understanding and so on. It is hoped that the multi-modal learning path of medical education curriculum thought and politics can be endowed by artificial intelligence technology, promote the sharing of medical education resources, the in-depth exchange of medical education topics, and establish a perfect multimodal learning path system. it not only provides a new multimodal path choice for the teaching mode of curriculum ideology and politics in medical education, but also provides a new educational ecosystem template for the reform of traditional medical education. Enhance medical students' sense of social responsibility, humanistic literacy, learning and communication ability, and embody the core of medical humanistic spirit is to care for life and realize humanistic care.

Compared with the multi-modal learning path of thought and politics in medical education curriculum enabled by artificial intelligence technology and traditional medical education curriculum, there are few artificial intelligence technologies integrated into traditional medical education curriculum and lack of multi-modal learning path. lack of effective interaction, it is difficult to carry out in-depth learning from the multi-dimension of vision, hearing, body feeling and interpersonal relationship. The multi-modal learning path of thought and politics in medical education curriculum under artificial intelligence technology can be divided into three categories: theoretical knowledge learning situation, operation skill learning situation and practical experience learning situation, and fully excavate the ideological and political elements in the three kinds of situations. from vision-hearing-body feeling-interpersonal relationship multi-organ multi-dimensional in-depth learning. Through this unique empathy ability, insight, inner feeling ability, connection analysis ability and so on, teachers can enlarge and project to the students through the technological intentionality. In addition to actively accepting and learning new technologies and actively adapting to the new changes, medical students must adhere to people's dominant position, strive to improve medical humanistic literacy and learn communication skills in medical education activities. Give

patients respect, understanding and humanistic care as much as possible in medical behavior.

## 6. Conclusion

First of all, this paper explains the necessity of integrating curriculum ideology and politics into medical education, that is, to cultivate medical students' humanistic accomplishment and sense of social responsibility, so that they can become talents with noble moral character and rational thinking. Then it expounds the current situation of medical education from three angles: the research on the current situation of thought and politics in the curriculum of higher medical education in colleges and universities, the application of artificial intelligence technology in medical teaching activities, and the related research of multimodal teaching interaction model theory. the research methods used in the three angles are analyzed. Finally, the paper puts forward the multi-mode learning path of thought and politics of medical education curriculum under the enabling of artificial intelligence technology, and carries on the explanation and meaning mining to it.

Aiming at the proposal of the existing multimodal learning path of thought and politics in medical education curriculum under the enabling of artificial intelligence technology, combined with the research on the current situation of thought and politics in higher medical education courses in colleges and universities, the application of artificial intelligence technology in medical teaching activities, and the related research on the theory of multimodal teaching interaction model, we will continue to make in-depth research breakthroughs from the following two points:

1.This paper analyzes how to better integrate the ideological and political elements into the curriculum of medical specialty through artificial intelligence technology, starting with the implementation path of theoretical knowledge, experimental operation and clinical practice operation, so as to realize the visualization of multimodal situational learning path.

2. Teaching reform should pay more attention to effectiveness, use convenient technology to develop teaching materials that are highly compatible with the teaching content, promote the application of multimodal teaching in domestic medical courses, and deeply excavate the feasibility and promotion value of the model path.

## Acknowledgments

Thank you for the support of Wenzhou philosophy and

Social Science Planning Project "Research on ideological and political Multi-mode Learning path of Medical Education Curriculum under artificial Intelligence Technology" (subject number: 23BM028YB). I would also like to thank everyone who wrote and studied this paper. Here, I would like to express my sincere thanks.

## References

- [1] Weiren Dong. Discussion on the concept and practice of thought and Politics in Medical Curriculum[J]. Journal of Anatomy, 2020,43(04):275-279.
- [2] Wei Wu, Huihan Li. A preliminary study on the Reform of ideological and political Teaching in Biology majors--taking Biochemistry as an example[J]. Microbiology bulletin, 2020, 47 (04):1191-1195. DOI:10. 13344/j. microbiol. china. 190925.
- [3] Lijun Liu, Wei Li, Changbin Chai et al.Exploration and practice of thought and Politics in Medical Microbiology course [J].Microbiology bulletin,2020,47(04):1178-1185.
- [4] Daliang Wang. Establish virtue, cultivate people, cultivate morality and cure Shuangxin--Exploration on the Application of Curriculum thought and Politics in Medical General courses[J].Chinese university teaching,2020(Z1):66-71.
- [5] Jijian Lu, Meimei Zhou, Xia Zhang et al. Exploration on the Teaching and Application of "Multimode + Human-computer Cooperation" based on MR experiment[J]. Journal of distance Education,2021,39(06):58-66.DOI:10.15881/j.cnki.cn33-1304 /g4.2021.06.007.
- [6] Tongju Wang. Application and Prospect of Virtual and augmented reality (VR/AR) Technology in Teaching[J]. Digital education,2017,3(01):1-10.
- [7] Liang Wen, Xunran Zhao, Liping He.Investigation and study on the attitude of medical undergraduates towards AI[J]. Continuing medical education,2019,33(07):12-13.
- [8] Mei Yue, Yejiang Zhang. Research on the Direction of Medical Teaching Reform in the era of artificial Intelligence[J]. Continuing medical education in China,2020,12(07):6-9.
- [9] Wei Kang, Wuning Zhong, Wei Wei et al. Exploration of artificial Intelligence in Personalized Network Teaching of Medical postgraduates under the background of big data[J]. Continuing medical education in China,2018,10(32):41-43.
- [10] Honghao Li, Bo Chen, Jianping Li et al. The present situation, problems and Countermeasures of artificial Intelligence Application in Medical Education[J]. Chinese Journal of evidence-based Medicine,2020,20(09):1092-1097.