

## **Research on the Training Mode of Master Degree Candidates Majored in Medical Imaging Technology from the Perspective of Industry-University-Research Collaborative Innovation**

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**Abstract:** At present, scholars at home and abroad have done a lot of theoretical research on master degree candidates' training mode. However, due to the late start of the research on the Industry-University-Research collaborative training mode, especially the research on the training mode of master degree candidates majored in medical imaging technology from the perspective of Industry-University-Research collaborative innovation, the exploration is still on the initial stage. From the perspective of Industry-University-Research collaborative innovation, through rational analysis of relevant theories, concepts, causes, problems, etc., this paper discusses the specific path of the training mode of master degree candidates majored in medical imaging technology, in order to provide reference for the training mode of master degree candidates majored in medical imaging technology from the perspective of Industry-University-Research collaborative innovation, and to provide reference for the later research on related issues.

### **1. Introduction**

#### **1.1 The concept of postgraduate education**

Postgraduate education is a form of education in which students continue their further study after graduation. It can be divided into master degree education and doctor degree education. It is the highest level of professional education in the educational structure. The essence of postgraduate education is different from the general attribute of undergraduate education and has more profound connotation. Firstly, its specialty is reflected in the fact that postgraduate education is a higher level of professional education based on undergraduate education. Secondly, it is a kind of elite education, which has high requirements on the basic quality and potential of individuals. It can play a role in promoting social progress and development, such as knowledge dissemination, knowledge innovation, talent training and scientific and technological development. Thirdly, it is about the exploratory of postgraduate education. Postgraduate education is a high-level activity, and high-level activity is exploration. Taking the learning and creation of knowledge as the logical starting point for the theoretical system of postgraduate education, the concept of postgraduate education is defined as follows: A high level of professional education characterized by research after finishing the undergraduate education. In a broad sense, this exploration process includes the mode, mechanism and ideas and all actions aiming at realizing postgraduate education. The emphasis of postgraduate education discussed in this paper lies in its training mode.

#### **1.2 The concept of postgraduate training mode**

The mode of postgraduate training is a kind of standard construction style and operation mode to realize the goal of postgraduate training. It has a certain style or characteristic in practice under the guidance of a certain educational concept. It is also obviously systematic and normative. It mainly includes training objectives, training process, curriculum setting, quality assessment and other elements. Without any of these factors, the postgraduate training mode cannot be fully described.

Each element affects and interacts with each other under the external influence, so as to form a whole with specific functions.

### **1.3 The concept of Industry-University-Research collaborative innovation**

Industry-University-Research collaborative innovation refers to the innovation activities of technology research and development carried out by the superior resources of multiple innovation subjects, mainly enterprises, universities and research institutes, with the collaborative support of the government, science and technology service intermediaries, financial institutions and other relevant subjects. This is a process of optimizing the allocation of innovation resources by promoting the effective combination of economy, education and science and technology. As an important subject of Industry-University-Research collaborative innovation, universities shoulder the important task of cultivating innovative research talents in order to promote the development practice of Industry-University-Research collaborative innovation.

## **2. The Problems Existing in the Entrepreneurial Education Mode of Medical Universities**

### **2.1 Insufficient postgraduate training**

The research on the training mode of postgraduates majored in medical imaging technology from the perspective of Industry-University-Research collaborative innovation should focus on the students. It should pay attention to the individual planning and development of the students in the process of training, as well as the embodiment of quality after training. However, according to the current situation, too much focus is placed on knowledge transformation, scientific and technological achievements and economic benefits, while not enough on human-oriented and personalized postgraduate training. In the process of training, if more focus is on economy benefit than postgraduate education, it is easy to deviate from the original intention of the training practice from the perspective of Industry-University-Research collaborative innovation. This situation may cause communication barriers between tutors and postgraduates, which will affect the quality of postgraduates' training and the output of collaborative innovation between industries, universities and research institutes to some extent.

### **2.2 The curriculum setting of Industry-University-Research is not highly compatible with the medical imaging technology major**

Due to the influence of major characteristics, traditional thinking and other factors, the cultivation of Industry-University-Research collaborative innovation in medical imaging technology is mostly focused on the direction of applied medicine. In the field of engineering and science, the curriculum setting is backward and develops slowly. Innovation and entrepreneurship education in foreign universities has started since the late 1940s, and its curriculum system has been constantly improved, from offering a variety of innovation and entrepreneurship curriculum modes to gradually combining the basic knowledge of innovation and entrepreneurship with professional courses which enables students to receive and learn knowledge of innovation and entrepreneurship imperceptibly in their daily study and life, and gives students more opportunities to think about ways of innovation and entrepreneurship in combination with their own practice. Due to the immature education mode of innovation and entrepreneurship in domestic universities, the curriculum setting is relatively lagging behind. They mainly carry out innovation and entrepreneurship education courses in the form of elective courses and lectures. There are few links between courses, and they are not combined with the characteristics of their specialty, so they cannot train innovative and entrepreneurial talents efficiently.

### **2.3 Lack of teachers for innovation and entrepreneurship**

The lack of focus on innovation and entrepreneurship education leads to the weak faculty allocation in medical universities. The teachers who teach the courses are basically teachers or counselors who are responsible for employment in schools. Most of these teachers have not received relevant innovation and entrepreneurship training and systematic learning, and they have

never had entrepreneurship experience, which is not convincing enough for teaching, so that the teaching level of entrepreneurship education is not up to the standard. Most of their instruction is cramming or even scripted. The courses of postgraduate level are highly specialized, it is difficult to penetrate the entrepreneurship content in them. In addition, there is little correlation between the content of medical imaging technology and entrepreneurship education, which leads to the fact that students attach more importance to the major than to entrepreneurship, and fail to integrate entrepreneurship into the scope of the major, thus failing to attract their attention and passion.

## **2.4 Students' entrepreneurial consciousness is weak. The corresponding entrepreneurial projects for the medical imaging technology major are scarce.**

First of all, postgraduates majoring in medical imaging technology have less time to absorb and think about innovative and entrepreneurial knowledge due to their heavy academic tasks and the professional characteristics of the major. In addition, colleges and universities don't pay enough attention on innovation and entrepreneurship, so that students' consciousness is relatively weak and their ability is insufficient. Secondly, due to the high professionalism of medical universities and the lack of corresponding entrepreneurial projects, many students still insist on working for hospitals and other public institutions after their postgraduate study. Finally, as far as the students' families are concerned, starting a business is risky. Comparatively speaking, stable jobs and well-paid hospital positions are strongly supported by families.

## **3. Study on Countermeasures of the Talent Training Mode of Industry-University-Research Collaborative Innovation**

### **3.1 Establishing innovative graduate training concept**

The innovative educational concept is helpful to guide the practice of the postgraduate training mode from the perspective of Industry-University-Research collaborative innovation. Under the guidance of the concept of national innovation system, the innovation system is constructed by integrating the superior resources of the government, enterprises, hospitals, universities and scientific research institutions and the development obstruction from old ideas is broken down. Thus, under the premise of taking root in China, the postgraduate training mode of Industry-University-Research collaborative innovation can be in line with the international standards, the quality of postgraduate students can be improved, and the postgraduate training mode of Industry-University-Research collaborative innovation which can be used for reference and formation can be put into practice.

### **3.2 Giving play to the collaborative effect of multiple subjects**

The development of the postgraduate training mode from the perspective of Industry-University-Research collaborative innovation is a complicated and long-term process, which is difficult to realize by the strength of a single subject. It is necessary to give play to the collaboration of multiple subjects. The subsystems of government, enterprises, hospitals, universities and scientific research institutions need to form a whole through collaborative cooperation. They also need to carry out resource integration and rational utilization, strengthen information communication and exchange, and develop diversified postgraduate training mode from the perspective of Industry-University-Research collaborative innovation in diverse fields, so as to promote the high efficiency of postgraduate training quality, the diversification of training fields and the diversification of training modes. It not only guarantees the quality of postgraduate training from the perspective of Industry-University-Research collaborative innovation to a certain extent, but also maximizes the effect of the whole system. First, defining their respective functions. Enterprises, hospitals, universities and scientific research institutions are all in the core subject of Industry-University-Research collaborative innovation. In the training process, it is possible to make the training process go smoothly by clarifying their respective responsibilities and obligations. Universities undertake the main responsibilities of the curriculum setting, teaching arrangement,

tutor teaching and postgraduate training. Universities pay attention to the deep exploration of postgraduates' theories and the preliminary teaching of students' practical ability. Scientific research institutions are committed to strengthening the research level and ability of postgraduates, and focus on exploring and giving play to their innovative ability. Enterprises and hospitals pay attention to the cultivation of postgraduates' practical ability and operational ability, and deepen the transformation of knowledge and achievements on the basis of mastering theories. Among them, each subject should build a psychological service platform through consultation, and define the ultimate goal of the training and their own responsibilities which are as follows: Putting people first and actively develop mental health services, paying attention to the mental health of postgraduates, tutors, researchers, enterprise talents and other related trainers in time to ensure their initiative can be fully played; Encouraging enterprises, universities, research institutions and other core subjects actively with other key subjects in collaborative innovation; According to their respective advantages and characteristics, actively exploring the development path of the training mode of postgraduates majored in medical imaging technology from the perspective of Industry-University-Research collaborative innovation, and summarizing the universal practice pattern and promoting it in the whole country; Encouraging extensive cooperation between hospitals, enterprises, medical colleges and scientific research institutes, attaching importance to the research and master of small projects, adopting the method of performance reward that small projects accumulated equal to big projects, in order to avoid paying attention to big projects but ignoring small projects; Fully mobilizing the diversified subjects from the society and different classes to actively participate in the training practice, so as to improve the postgraduates' quality.

### **3.3 Improving the supervision and evaluation system**

The supervision and evaluation system of the postgraduate training of Industry-University-Research collaborative innovation should be improved and the construction of cultivation should be strengthened in all aspects, so as to guarantee and realize the objectives and quality of postgraduate training, effectively ensure that the cultivation subjects of Industry-University-Research collaborative innovation always adhere to the people-oriented principle, and effectively improve the quality of postgraduate training. First, strengthen the supervision and management system. From the cultivation process to the output of results of Industry-University-Research collaborative innovation, the supervision system of the whole link should be constructed, and the supervision and approval of the feasibility, quality, results and other contents of each link should be strengthened, especially the supervision during and after the event which is related to the quality of the training and the implementation of the final training situation and cannot be easily ignored. Unqualified products and violations of behaviors should be dealt with seriously. In the process, mechanism of the survival of the fittest should be carried out. The supervision of training subjects and objects should be strengthened. The main task is to supervise the cultivation subjects' use of special training funds and power, and to supervise their compliance with rules and behavior norms in the training process, so as to avoid the occurrence of abuse of funds, lack of power, ultra vires, disregard of regulations and other phenomena. For postgraduates, the objects of the cultivation, the main task is to supervise the independence and originality of their papers and scientific achievements, and avoid plagiarism and other academic misconduct. The external and internal supervision should be strengthened and the internal and external supervision system should be improved. The internal supervision refers to establishing internal institutions of mutual supervision between the training subjects and the objects, and holds regular supervision, criticism, and review work. The external supervision should integrate the supervisory members outside the training subjects, conduct irregular and sudden inspection, and publish the inspection results to the society in a timely manner. The methods above are to ensure the postgraduate training process from the perspective of Industry-University-Research collaborative innovation can be fair and just, and the training quality can be guaranteed under the joint operation of the internal and external supervision system.

#### 4. Conclusion

In recent years, the postgraduate training mode of Industry-University-Research collaborative innovation is a cooperative way to effectively improve postgraduates' quality and realize collaborative innovation. It can cultivate comprehensive talents in line with the needs of social and economic development by integrating multiple main resources. With the typical practice of the postgraduate training mode of Industry-University-Research collaborative innovation in the United States, Germany, Japan and other developed countries, as well as years of experience reference and self-development, China has achieved certain results in the quantity and quality of the postgraduate training mode of Industry-University-Research collaborative innovation. However, due to economic development, social situation and other practical reasons, it is still in the exploration stage, and the popularization of the forming model with universal applicability and strong operability is still greatly restricted. From the perspective of Industry-University-Research collaborative innovation, through rational analysis of relevant theories, concepts, causes, problems, etc., this paper discusses the specific path of the training mode of master degree candidates majored in medical imaging technology, in order to provide reference for the training mode of master degree candidates majored in medical imaging technology from the perspective of Industry-University-Research collaborative innovation, and to provide reference for the later research on related issues.

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