Medical-engineering Cross-innovation Postgraduate Talent Training

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How to cite this paper: Xuezheng Yue, Kunyi Liang, Meng Zhao, Jie Zhao, Lie Zhu. (2023). Medical-engineering Cross-innovation Postgraduate Talent Training. The Educational Review, USA, 7(3), 372-374. DOI: 10.26855/er.2023.03.017

Received: February 28, 2023
Accepted: March 26, 2023
Published: April 24, 2023

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Abstract

At the beginning of the new year of 2020, the new coronavirus swept across the motherland. Scientific researchers throughout the country overcame scientific difficulties and wrote papers for the motherland. Under the challenge of the epidemic situation, medical workers in the front saved the dying and healed the wounded, while the scientific researchers in the rear tackled scientific and technological problems. The two sides cooperated sincerely to unify medical practice and theoretical development, and effectively improved the scientific and technological level of China's medical industry. Health care is closely related to human survival, development and quality of life. At present, mankind is still facing the threat of major diseases, and the development of medical and health services has increasingly shown strategic significance to national security, social stability and even national survival. This article introduces a new model of talent cultivation at the graduate level. The cross-dissolution of clinical medicine and manufacturing engineering produces novel ideas and new technologies.

Keywords

Medical-engineering, Cross-innovation, Postgraduate

1. Introduction

In the historical mission of the new era, the country and the people have put forward new requirements for front-line scientific research. The technical bottlenecks of many high-end medical devices need to be broken through. However, the vertical development of traditional single disciplines will always encounter various bottlenecks while the multidisciplinary scientific research model often collides with different sparks. For example, the intersection of chemistry and physics forms physical chemistry and chemical physics, and the intersection of chemistry and biology forms biochemistry and chemical biology. The continuous development of these interdisciplinary disciplines has greatly promoted scientific progress. Therefore, interdisciplinary research reflects the trend of science towards comprehensive development. Implementing the development strategy of medical-industrial integration is the only way for the innovation and development of medical technology in China (Lv S et al., 2021), and it is also an important way for traditional engineering to radiate new vitality (Huntzinger D N et al., 2007).

In the context of the combination of medicine and engineering, in recent years, many first-class universities at home and abroad have taken the training of medical-engineering interdisciplinary talents as the key direction of innovative talent training (Galand B et al., 2012). Foreign countries carried out and established medical-engineering interdisciplinary research earlier. Since the 1970s, the world's top research universities have invested heavily in interdisciplinary research, and successively established interdisciplinary research institutes or research centers. For example, the Bio-X Research Center of Stanford University was established in 1998. The center is committed to solving various life science
problems by bringing together the strengths of biology, physics, medicine and other disciplines. Domestic interdisciplinary research emerged in the late 1980s. In recent years, various domestic universities have established interdisciplinary research entities characterized by the combination of medicine and engineering, providing a broad stage for interdisciplinary research. For example, the Med-X Research Institute of Shanghai Jiao Tong University, which was formally established in November 2007, mainly involves four fields: biomedical engineering, biology, imaging medicine and nuclear medicine, and materials science and engineering. It consists of Digital Medical Engineering Center of the Ministry of Education, Nano Biomedical Engineering Research Center and other research institutions. In terms of research direction, relying on the university's advantages in clinical medicine and science and engineering, it is oriented to solve clinical medical problems, carry out cutting-edge cross-scientific research, and develop high-end medical technology products (Perrenet J C et al., 2000).

Therefore, the cross-integration of medicine and engineering has formed an irresistible trend. In the context of the construction of new engineering disciplines, how to further promote the development of "medicine-engineering intersection" and realize the cultivation of interdisciplinary talents is a topic of great concern. Due to the wide range of fields and rapid development of medical-engineering interdisciplinary research, there is a lack of mature medical-engineering interdisciplinary courses in many research directions. The current university education model fails to meet the needs of the current rapid growth of high-level interdisciplinary medical and engineering talents cultivation when faced with problems such as the distribution of multidisciplinary teaching, the construction of knowledge learning system, the combination of theory and practice and so on (King J C. et al., 2011). Therefore, researching and solving such problems is an important measure to help the medical-engineering interdisciplinary talent training model to develop steadily.

2. Method

2.1 With scientific research as the core, promote the establishment of interdisciplinary innovative scientific research projects in medical and engineering disciplines

Establish a "medical-industrial cooperation" platform and promote the establishment of the "medical-industrial joint innovation research institute". Combining the superior disciplines of University of Shanghai for Science and Technology, with major hospitals and medical institutions in Shanghai, establish a new cooperative scientific research project, joint scientific research to tackle key problems, and formulate medium and long-term development strategies and stable and efficient project cooperation mechanisms in key technology research (Vest C M. et al., 2008).

2.2 Guaranteed by innovative mechanisms, deepening collaboration among institutions

Taking advantage of policy advantages, integrate the superior resources of Shanghai universities and medical and health care, chemical and pharmaceutical industries, promote the construction of medical and engineering innovation platforms, and deepen the creation of model projects for school-enterprise cooperation, platform integration, and resource integration. Establish a university-level medical-industry conversion platform, a Yangpu District industry-university-research conversion platform, a Shanghai coordination and innovation platform, and a transformation platform in the Yangtze River Delta region, besides introduce social capital to jointly promote industry-university-research cooperation.

2.3 Reform of cultivation of interdisciplinary talents

With the goal of cultivating medical-engineering compound talents, around the needs of health technology innovation, reform and innovation are carried out in organizational structure, management mechanism, teaching and scientific research, personnel training and so on, to strengthen the integration of advantageous disciplines, to build a medical-engineering joint innovation graduate school, and to explore excellent medical science and technology. A new mode of training talents with combined engineering and engineering will create a highland for the cultivation of high-end talents combining medical and engineering in local colleges and universities.

The specific content includes:

"All-round" training management guarantee plan for cross-compound talents:
Formulate relevant policies to provide all-round management guarantees such as scholarship support, supporting mechanisms, and practice funds for the joint training of "medical engineering" postgraduate students. In addition, teaching secretaries, counselors, and base administrators are equipped to pay attention to various learning and living needs, ideological education, and psychological counseling of postgraduates in the process of cultivation and practice.

Cross compound talent "double tutor" joint platform construction plan:
Share the superior resources of the university and the medical industry, innovate the cooperation mechanism of medical industry and the university, focus on promoting the platform construction of the "Medical-Industry Joint Innovation
3. Result and discussion

A. Establish a top-level management mechanism for the platform, integrate the scientific research innovations in medical-related fields and front-line medical application projects carried out by the university into the platform management, and strengthen the depth and breadth of the university's scientific research achievements in medical-industrial cooperation projects. At the same time, in the operation mechanism, deepen the participation of hospitals and enterprises in the project, and explore the management mode of the linkage and integration among the three.

B. Establish an effective long-term promotion mechanism to strengthen scientific research information exchange and communication. Universities share scientific research progress with hospitals and enterprises respectively. Hospitals provide interdisciplinary practice opportunities and product clinical testing experiments to universities and enterprises respectively. Enterprises provide hospitals and schools with the latest technological solutions and research results transformation services respectively. The three are closely integrated to achieve efficient communication between universities, hospitals and enterprises.

C. Research medical and engineering cross graduate training program
Deeply promote the interdisciplinary cooperation between medicine and engineering, give full play to the respective advantages of medicine and engineering, jointly solve practical problems encountered in clinical practice, lay the foundation for interdisciplinary development, knowledge spillover and industry promotion, actively promote academic exchanges and scientific research innovation, and share cooperation results. With talent training as the starting point, strengthen exchanges and cooperation by allowing students and tutors jointly carry out project research.

4. Conclusion

A. Under the opportunity of high-level university construction, aiming at the new demands of healthy China, the university will give full play to the advantages of cooperation with various medical institutions and medical colleges, deepen integration, establish a discipline exchange mechanism, conduct overall planning at the administrative level, optimize the allocation of resources and personnel flow, conduct regular academic discussion and exchange activities at the scientific research level, and unblock the information exchange channels between hospitals and universities.

B. Relying on the respective disciplines and scientific research advantages of both parties, establish a joint cultivation model of universities and hospitals, let hospitals participate in the training of talents in universities, let universities participate in hospital medical practice, and explore the possibility of medical-engineering interdisciplinary teaching in the new era and new situation.

C. In the process of solving key medical problems, explore new university-enterprise-medical cooperation models, generate new medical-engineering interdisciplinary directions, form disciplinary research characteristics, drive the development of disciplines, transform medical-engineering interdisciplinary achievements, and boost our high-level university construction.

Acknowledgement

Thanks for university of Shanghai for Science and Technology Postgraduate Training Base Project, Project of Shanghai Graduate Education Society (ShsgeG202214).

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