



Research on Multi-dimensional Synergistic Training Model for Electronic Information Master's Program in Beijing-Tianjin-Hebei Region

Jianhong Zhang*, Wenle Bai, Menglong Wu

North China University of Technology, Beijing, 100144, China

*Email: zjhncut@163.com

Abstract. In light of the national strategy for innovation-driven development and the coordinated growth of Beijing, Tianjin, and Hebei, the cultivation of high-level talent in the electronic information industry is crucial for regional economic development. Ultimately, a multi-dimensional talent cultivation model is established, encompassing four key dimensions: "talent cultivation + innovative enterprises," "talent cultivation + new research and development institutions," "talent cultivation + peer institutions," and "talent cultivation + entrepreneurship competitions."

Keywords: Multi-dimensional collaborative training model; integration of education; coordinated development of Beijing, Tianjin and Hebei; scientific and technological innovation.

1 Introduction

In 2020, General Secretary Xi Jinping highlighted the significance of postgraduate education at the National Conference on Postgraduate Education, particularly emphasizing the enhancement of innovation skills among postgraduates to address the diverse talent requirements of the new era. This address not only clarifies the direction of graduate education but also establishes the objectives for universities and educational institutions. In this regard, the Development Program for Professional Degree Graduate Education (2020-2025) explicitly states that by 2025[1,2], the enrollment of master's professional degree students will increase to two-thirds of the total master's graduate enrollment. This policy direction signifies the growing prominence of professional master's education within China's talent development framework. Nonetheless, amidst the ongoing rise in postgraduate enrollment and the relatively inadequate conditions at universities, a significant challenge lies in effectively enhancing the quality and adaptability of professional master's talent cultivation.

The Beijing-Tianjin-Hebei region, a vital hub for China's electronic information industry, is rich in talent and technological resources, making it a key player in driving national innovation and development. However, the rapid growth of the regional economy and ongoing advancements in science and technology have led to a diversified and

complex demand for talent in the electronic information sector[3,4]. Hence, higher education institutions must strengthen their connection with local economic demands and enterprises while cultivating professional master's degrees in electronic information, focusing on boosting students' practical innovation and problem-solving abilities. For the training of professional master's students in electronic information within the Beijing-Tianjin-Hebei region, there is an urgent need to develop a multifaceted and collaborative training model. This model should consider the systematic and specialized aspects of academic education while integrating resources from industries, enterprises, and research institutions to achieve deep synergy between education, science and technology, and industry. This approach aims to produce high-level composite talents equipped with a strong theoretical foundation capable of adapting to the rapidly evolving market landscape. Establishing this new collaborative training model will better align with the strategic needs of regional synergistic development and contribute to the high-quality advancement of the electronic information industry and the enhancement of innovation capacity in the Beijing-Tianjin-Hebei region.

In conclusion, this study will thoroughly examine the collaborative training model for professional master's degree programs in electronic information, grounded in the Beijing-Tianjin-Hebei collaborative development strategy. The goal is to provide robust theoretical support and practical guidance for achieving integrated talent cultivation and regional economic growth. Given the dual pressures of a changing global economic landscape and domestic economic transformation, this research not only holds important theoretical significance but also aims to make a lasting impact on promoting sustainable regional economic development.

2 Current Problems in the Training of Master's Degree

With the continuous growth of the enrollment scale of professional master's degree students, the professional master's degree training in domestic colleges and universities is faced with a number of challenges, which involve multiple aspects and require systematic reforms and multi-party collaborations in order to be effectively solved, and their main manifestations are as follows:

2.1 Lack of Regional and Industry-Specific Characteristics in Personnel Training

The first and foremost outstanding problem is the lack of regional and industrial characteristics of talent cultivation, resulting in the increasing homogenization of cultivation objectives. The training objectives of different regions and different institutions are often very similar, lacking in pertinence, and failing to fully consider regional needs and industry characteristics [5]. This situation not only makes it difficult to meet the social needs of the national innovation-driven development strategy and industrial transformation and upgrading of the cultivated talents, but also reduces the efficiency of the use of educational resources. Colleges and universities fail to effectively combine the local industrial structure and development planning to formulate the corresponding

training programs, resulting in the professional curriculum can not fully reflect the latest development trends and technological needs of the industry, which makes the students' innovation ability can not be effectively cultivated, and the graduates are difficult to adapt to the fast-changing industrial environment in the actual work.

2.2 Disconnect Between the Training Process and the Target Orientation

The problem of disconnection between the cultivation process and the target orientation is another prominent problem, and it is also becoming increasingly obvious. Colleges and universities fail to clearly distinguish the cultivation objectives of professional master's degree and academic master's degree, resulting in the curriculum and teaching arrangements of the two being too similar, and the proportion of practical courses in professional master's degree programs being insufficient. In addition, they mainly rely on traditional classroom teaching methods and lack of practical teaching modes in line with the characteristics of professional master's degree, which makes students lack the necessary coping ability when they face the challenges of actual work. The assessment and evaluation system also needs to be further optimized. Currently, too much emphasis is placed on the importance of academic papers, and the assessment of professional practice ability is neglected. Coupled with the irrational structure of instructors and the lack of instructors with rich practical experience in the industry, this undoubtedly further aggravates the disconnection between theory and practice.

2.3 Lack of Off-campus Practice Sessions

The third outstanding problem is the serious lack of off-campus practice links. Although many colleges and universities have established off-campus practice bases, these bases often remain only at the contracting stage and fail to play a real role. Students generally do not have enough time for internship in enterprises, and it is difficult for them to have an in-depth understanding of the industry practice. The content of practice is often superficial, and enterprises are reluctant to let students participate in the core project for confidentiality reasons. The guidance of enterprise mentors is often a formality and lacks systematicity and continuity[6]. Industry-university-research project cooperation mostly stays on the surface, lacking substantive R&D cooperation, which seriously affects the cultivation of students' practical ability.

2.4 Disconnect Between the Training System and the Needs of Society and Industry

The problem of the disconnection between the training system and the needs of society and industry is becoming more and more prominent. The speed of updating the curriculum cannot keep up with the speed of technological development in the industry, and there is a serious lag in the teaching content. The response to the cultivation of talents in emerging fields such as artificial intelligence and big data is not timely, and it is difficult to meet the needs of the rapidly developing industry. The interdisciplinary integration is insufficient, failing to fully cultivate students' interdisciplinary knowledge

structure and comprehensive application ability. At the same time, the cultivation system focuses too much on professional skills and neglects the cultivation of soft qualities in the workplace such as communication and teamwork. Insufficient internationalization vision is also a significant problem. The cultivation system lacks internationalization elements, making it difficult to cultivate talents with global competitiveness.

2.5 Insufficient School-enterprise Cooperation and Single Talent Training Model

The problems of insufficient university-enterprise cooperation and unitary talent cultivation mode also need to be solved urgently. At present, school-enterprise cooperation mostly stays on the surface and lacks a long-term mechanism for in-depth integration. Enterprises have insufficient initiative and low participation in the talent cultivation process. There is a lack of effective two-way communication mechanism between college teachers and enterprise personnel, which limits the combination of theory and practice. The innovation and entrepreneurship education is insufficient and fails to effectively cultivate students' innovative thinking and entrepreneurial ability [7]. At the same time, the cultivation mode is too rigid, and it is difficult to meet the needs of students' individualized development.

At present, domestic universities are facing many challenges in the cultivation of professional master's degree, which cover many aspects from talent cultivation objectives to school-enterprise cooperation, and urgently need systematic reform and multi-party collaboration in order to effectively solve them.

3 Multi-party Collaborative Training Model

In view of the existing problems in the cultivation of professional master's degree and the urgent demand for senior talents in the electronic information industry in Beijing, Tianjin and Hebei, effective reform and improvement of cultivation quality require the concerted efforts of universities, enterprises and the government. This systematic reform should not only address the existing specific problems such as homogenization of training objectives, disconnection between theory and practice, insufficient off-campus practice links, lagging training system, etc., but also optimize the cultivation system of professional master's degree by constructing a multifaceted synergistic model.

In order to solve the existing problems, this paper will start from "talent training + innovative enterprises", "talent training + new research and development institutions", "talent training + brother colleges and universities", "Talent training + entrepreneurship competition" to explore the construction of multiple synergistic talent training mode.

In the following, we will elaborate how to form a set of practicable solutions under the multiple synergistic mode by means of integrating the resources of all parties, clarifying the regional and industrial orientation, strengthening the cooperation between universities and enterprises, and promoting the collaborative innovation of industry, academia and research, in order to comprehensively improve the quality of talent

cultivation of professional master's degree, and then better adapt to the needs of the regional economy and industrial development.

3.1 “Talent Cultivation + Innovative Enterprises”

By establishing in-depth partnerships with leading electronic information enterprises in the region, this model not only introduces the actual needs and cutting-edge technologies of enterprises, but also emphasizes the transfer of enterprise culture and practical experience. Inside and outside the classroom, students are able to participate in actual projects in areas such as software development, system integration and data analysis, and this participation significantly enriches their hands-on experience. In addition, companies can provide students with real-world cases to help them apply their theoretical knowledge to solve real-world problems. This approach not only enhances the practical ability of students, but also provides a guarantee for enterprises to cultivate high-quality talents in line with their needs, thus realizing a win-win situation.

3.2 “Talent Cultivation + New R&D Organizations”

Cooperation with new R&D organizations such as Xiongan New Area, Beijing Zhongguancun Science City and Huairou Science City expands students' research horizons and enables them to come into contact with cutting-edge technology and the latest scientific research achievements. In the process, students can not only participate in scientific research topics, but also think deeply about the connection between academic theories and real needs. For example, participating in the development of artificial intelligence algorithms or the application research of new materials can effectively enhance their scientific research and innovation ability. At the same time, students' research results can be directly applied to practical social problems, promoting the transformation and application of scientific research results and promoting the development of regional innovation ecosystem.

3.3 “Talent Cultivation + Sister Institutions”

This model realizes resource sharing and complementary advantages by establishing cooperative relationships with other universities in the region, enabling universities to leverage each other's advantageous specialties and distinctive curricula to jointly promote the quality of talent cultivation. Various forms such as joint cultivation programs, mutual recognition of credits, and exchange of faculty can greatly enrich the learning experience of students and cultivate composite talents with both professional knowledge and a broad vision[8]. In addition, this kind of cooperation also promotes communication and learning between different disciplines and helps students better understand the importance of interdisciplinary collaboration.

3.4 “Talent Training + Entrepreneurship Competition”

Organizing and participating in various entrepreneurship competitions can not only stimulate students' innovative spirit, but also improve their teamwork and leadership skills. Through actual project incubation, students not only learn how to come up with a business plan, but are also able to practice key skills such as market research, product development and project management. In the process of incubating and supporting potential entrepreneurial projects, students also receive feedback from mentors and investors, which is crucial for subsequent career development [9,10]. In this way, students are able to put their ideas into practice and promote the development of the regional innovation and entrepreneurship ecosystem.

Through the above multi-dimensional collaborative training model, not only can it effectively dock the regional industrial demand and ensure the synchronization of talent training and industrial development, but also significantly improve the comprehensive quality of students. For example, by integrating theoretical learning and practical operation, students can not only lay a solid foundation in professional knowledge, but also cultivate problem-solving ability, innovative thinking and teamwork ability by participating in actual projects.

In addition, this model promotes the deep integration of industry, academia and research. By integrating the strengths of enterprises, research organizations and universities, it can accelerate the transformation of research results and help create a good innovation ecosystem. This innovation ecosystem not only improves the efficiency of research, but also effectively promotes local economic development.

In terms of the cultivation of international vision, cooperation with sister institutions and international research organizations enables students to be exposed to a wider range of knowledge and experience, and improves their international competitiveness. Meanwhile, the university can organize international seminars and exchange activities to provide students with an international learning environment and enhance their global vision.

4 Conclusion

This paper presents a multifaceted and synergistic model for cultivating professional master's talent in response to the developmental needs of the electronic information industry in the Beijing-Tianjin-Hebei region. This model addresses several challenges currently faced in the training of professional master's degree students, including insufficient alignment with regional and industrial characteristics, inadequate emphasis on practical skills, and a lack of deep collaboration among industries, universities, and research institutions. By leveraging the strengths and resources of local colleges, enterprises, and research institutions, this model encompasses four key dimensions: “talent training + innovative enterprises,” “talent training + new R&D institutions,” “talent training + peer universities,” and “talent training + entrepreneurship competitions.” Ultimately, this paper proposes an open, collaborative education ecosystem that fosters comprehensive cooperation across these dimensions.

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