Research and Practice on Enhancing the Quality of Talent Cultivation in Computer Science and Technology Major at Local Universities

Longwei Li*, Linlin Wang, Guiyang Liu, Jun Gao, Shuxin Yin

Heilongjiang Bayi Agricultural University, Daqing, Heilongjiang, China

longxiaowei202410@163.com

Abstract. In the field of higher education, the enhancement of talent cultivation quality is a core component of teaching quality projects. Among many majors, computer science, due to its unique market demand and the speed of technological innovation, has become a strong weight in university competition. In recent years, the talent cultivation model of computer majors has attracted widespread attention. This paper deeply studies the current situation of computer science and technology major construction in local universities, analyzes existing problems, and proposes targeted reform ideas. The aim is to enhance the talent cultivation quality of computer majors in local universities to better adapt to the needs of society and the market. Through these reforms, it is expected to cultivate more computer professionals with innovative spirit and practical ability.

Keywords: Enhancement of talent cultivation quality, Computer major, Reform ideas, Local universities.

1 Introduction

In today's era of rapid advancements in information technology, the field of computer science and technology has emerged as one of the most dynamic and significant disciplines in higher education. As a critical component of higher education, local universities play a pivotal role in cultivating a substantial number of computer professionals. However, during the process of talent development, local universities face numerous challenges, including inadequate resource allocation, outdated teaching models, and insufficient practical training. Addressing these bottlenecks and establishing a talent cultivation model that aligns with local conditions and market demands is the central focus of this study. By exploring innovations in talent cultivation models, optimizing the curriculum system, enhancing practical teaching, and deepening industry-education integration, this paper aims to provide theoretical guidance and practical references for the development of computer science and technology programs at local universities. This research seeks to promote the reform and advancement of computer education in local universities in China, ultimately fostering the

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cultivation of high-quality computer professionals who can meet the evolving needs of the times.

2 The Present State of Professional Talent Cultivation in Local Universities

In 2012, the Ministry of Education promulgated the "Undergraduate Major Catalogue of Ordinary Universities (2012)," officially designating computer science and technology as a professional discipline category, signifying the formal establishment of this discipline [1]. Nevertheless, in the contemporary era characterized by rapid economic growth and intense talent competition, the traditional mode of talent cultivation has proven inadequate to meet society's demands. Particularly in recent years, some students have encountered the predicament of "difficulty in securing employment". Hence, exploring strategies for talent cultivation in computer science and technology majors and enhancing the quality of talent cultivation has emerged as an inevitable choice for universities, especially local ones.

In actuality, the current status of computer specialty construction at local universities is influenced by a multiplicity of factors, such as talent cultivation orientation, course configuration, faculty strength, and student source conditions, etc. [2]. These factors collectively exert an impact on specialty construction, determining the quality and characteristics of talent cultivation. The following are the principal problems."

2.1 The Talent Cultivation Model Remains Unclear

The computer science and technology major (hereinafter referred to as the computer major) in local bachelor's degree institutions was established approximately around 2002, signifying the extensive dissemination of computer education in local colleges and universities. Consequently, the issue of "homogenization" within the talent cultivation mode has gradually manifested [3]. As of now, the number of computer major sites in China has surpassed 1,000. The majority of universities, when formulating talent cultivation models and plans, have failed to fully take into account the characteristics of local college students and local peculiarities. This has resulted in a low degree of correspondence between the course content and the local society's demand for computer major talents, thereby triggering subsequent problems."

2.2 Neglect of Practical Teaching

In the domain of computer science, the integration of practice and theory is of paramount importance. Presently, the teaching mode in some local universities still lays a greater stress on the imparting of theoretical knowledge. The experimental segment is predominantly demonstration and verification-oriented, with the content frequently adhering to the outdated teaching framework or relying on off-the-shelf simulation software, lacking in innovation. This model constrains the students' opportunities for

genuine practice, hindering them from fully exercising and enhancing their engineering practical capabilities."

2.3 The Inability to Effectively Integrate Local Enterprise Resources

In the context of the profound integration of industries, the cooperation between schools and enterprises constitutes an efficacious approach for nurturing applied talents [4]. The collaborative outlook of local universities is disproportionately centered on large and renowned enterprises and companies, while neglecting the potentially promising local enterprises. These local enterprises boast abundant industry experience, practical opportunities, advanced technical equipment, and a profound perception of market demands. Nevertheless, they have not been fully exploited and effectively harnessed by universities. This lopsided cooperation strategy restricts the in-depth integration of education and local industries and squanders the opportunity to provide students with diverse practical platforms."

3 The Thought Schema for the Reform of the Professional Talent Cultivation Model

In consonance with the school-running orientation of our university and grasping the demand for talents for local economic construction as the anchor point, with the purpose of cultivating high-quality applied and skilled IT talents, the strategies of "computational thinking" and "innovation and entrepreneurship thinking" are recognized as the core of professional construction. Explorations have been carried out in aspects such as the talent cultivation model, the professional training plan, the curriculum system, and the construction of the teaching staff. The construction of the computer major is promoted methodically to cultivate high-quality and applied talents that are consistent with the development of the industry. "

3.1 Defining the Training Orientation Precisely

Defining the training orientation as a "professional type of talent" will engender more notable training outcomes [5]. Local universities should primarily position their operations with the aim of serving local economic and social development. The intimate integration of educational content with local industries can cultivate truly application-oriented talents who are well-adapted to the local economic and social development requisites [6]. These talents not only need to master the fundamental theories of computer science but also need to possess the capability to apply these theories to solve practical problems. For example, taking the institutions in Heilongjiang Province as an illustration, they can focus on catering to the needs of agricultural modernization and informatization based on the backdrop of China's modern agriculture and train specialized talents who can apply and conduct research on computer technology in the field of agricultural science and technology. In the specialty configuration, these schools accentuate agriculture-related information technology knowledge, such as

agricultural information engineering, agricultural mechanization, and intelligent agricultural technology. The study and application of these fields not only enhance students' professional skills but also closely align their professional knowledge with the local economic backdrop.

3.2 Crafting Talent Cultivation Schemes Aligned with Market Requirements

When formulating the goals of talent cultivation, comprehensive evaluations and in-depth market investigations should be conducted within the realm of computer hardware and software. Based on these analyses, a precisely delineated and targeted talent cultivation scheme is established.

The talent cultivation model of local universities ought to deviate from the traditional paradigm of cultivating academic talents and establish an integrated model that amalgamates learning, practice, management, and service capabilities [7]. The establishment of this model makes the educational content of local universities more consonant with the actual requirements of the market. With the objective of fostering students' innovative and practical competencies, the talent cultivation scheme can be dynamically adjusted in accordance with alterations in market demands. The design encompassing knowledge, ability, and quality dimensions ensures the timeliness and forward-looking nature of educational content. The talent cultivation scheme takes "application" as its core, continuously updates and reformulates courses and teaching content, and designates "application" as the core mission, with the aim of cultivating students into highly proficient and skilled composite applied talents.

3.3 A Sophisticated and Multilayered Curriculum System Architecture

The curriculum system is partitioned into four core constituents: general education courses, discipline-based courses, professional education courses, and practical teaching components. This hierarchical modus operandi is engineered to furnish students with a comprehensive and structured learning trajectory. General education courses primarily establish the bedrock for interdisciplinary cogitation among students. Discipline-based courses are attained via two channels: basic courses and discipline-specific courses, delving into the crux of computer science. Basic courses encompass mathematics and natural sciences, bestowing students with a sturdy theoretical underpinning. Discipline-based courses incorporate courses such as "Analog Electronics" and "Advanced Language Programming," which foster students' rudimentary system design capabilities. Professional education courses, contrarily, focus on the analysis, design, and verification of complex software systems, augmenting students' knowledge depth and expanse. Practical teaching is categorized into basic practice, professional practice, and integrated practice. Basic practice consolidates students' fundamental knowledge and skills. Professional practice augments students' practical proficiencies through in-class experiments, comprehensive experiments, integrated design, and extracurricular research and innovative practices. Integrated practice integrates theory and practice to cultivate students' capacity to address intricate problems.

3.4 Giving Equal Weight to Practice and Innovation

Computer science is renowned for its high degree of practicality. Hence, local universities ought to pay particular attention to fostering students' practical skills and innovative capabilities [7]. Incorporating research outcomes into the classroom, opening laboratories, and carrying out graduation projects based on real-world projects can all effectively advance teaching and elevate the level of course construction. For instance, our school encourages academic leaders and core faculty members to actively engage in students' scientific research training and science and technology competitions, offering professional guidance to students. Under the guidance of teachers, students participate in scientific research projects, apply for university innovation and entrepreneurship programs. They also join the computer association or form study interest groups and are encouraged to take part in various prestigious university science and technology competitions, such as the Blue Bridge Programming Design Competition and the Computer Design Competition. All of these significantly enhance students' practical and innovative abilities. Through collaborating with local enterprises such as Harbin Turin Yunzhi Technology Co., Ltd., students can achieve the transformation from theory to practice by participating in real-world projects of local enterprises.

3.5 Fortifying the Construction of the Teaching Body

Teachers play a cardinal role in talent nurturing. To address the predicaments of technological obsolescence, talent paucity, and deficient teaching proficiency confronted by the computer science faculty of local universities, an "external recruitment" + "internal training" paradigm has been contrived. "External recruitment" pertains to the formulation of captivating talent recruitment policies, the bestowal of munificent remuneration and propitious research circumstances, and the enlistment of doctoral graduates and professionals endowed with copious industry experience to join the teaching body. "Internal training" implies the regular orchestration of teachers to partake in professional training in key domains such as nascent technologies, new programming languages, and software development methodologies. Particular heed is dedicated to cutting-edge technologies like artificial intelligence, big data, and blockchain, ensuring that teachers can keep abreast of technological progressions and impart the latest knowledge to students to fulfill market requisites.

Simultaneously, an efficacious mechanism for teachers to assume positions in enterprises for on-the-job training ought to be instituted d, facilitating teachers to acquire an in-depth comprehension of the actual exigencies and work processes of enterprises [8]. For example, young teachers can be dispatched to Suzhou Chixing Technology Co., Ltd. for on-the-job training, where they can engage in project development and technological research, amassing invaluable practical experience and evolving into dual-qualified pedagogues. The promotion of information-based course construction is also advocated, employing online teaching platforms and virtual laboratories, among other technological modalities, to enrich teaching resources and expand teaching space [9]. Teachers are encouraged to participate in course construction and reform, optimizing course configurations based on industrial needs and the actual circumstances of

students, introducing actual projects and case studies from enterprises, and enhancing students' practical competences and innovative mentalities.

4 Conclusion and Prospects

In the contemporary epoch characterized by ever-intensifying competition among computer-related talents, local universities not only shoulder the onus of fostering professional talents but also are obliged to clarify their own positioning, accentuate their professional peculiarities, and progressively facilitate their development. On the one hand, they should actively establish collaborative ties with enterprises, fully exploit enterprise resources, and efficaciously enhance students' practical skills, amassing precious practical experience for them and thereby fortifying their overall capabilities. On the other hand, whilst actively forging connections with the external world and constructing novel models of talent cultivation, local universities should consolidate internal construction to create a propitious environment for students' growth. This encompasses clarifying the training orientation and formulating talent training plans with professional attributes, establishing a curriculum teaching system and a practical teaching system. Only by embracing an internal and external enhancement strategy can local universities keep abreast of the national construction requisites, fulfill their educational function, gradually escalate the quality of computer professional talent cultivation, and cultivate talents with a broad knowledge foundation, practical proficiency, and innovative thinking and a comprehensive mentality. This will render the computer professional education in local universities more in consonance with the rapid advancement of science and technology and the actual demands of society, infusing fresh vitality into the development of local economic and social affairs and making affirmative contributions.

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