

Digital Intelligence Empowerment and Collaborative Cultivation: The High-quality Development of Postgraduate Education

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Abstract: Against the backdrop of the rapid development of digital-intelligent technologies and the accelerated advancement of the national innovation-driven strategy, postgraduate education, as the core of high-level talent cultivation, has reached a crucial juncture of transitioning from "scale expansion" to "quality elevation". This paper systematically sorts out the new situation confronted by current postgraduate education, conducts an in-depth analysis of practical dilemmas in the governance system, training model, employment structure and other aspects, and puts forward reform paths: promoting the modernization of postgraduate education governance through "digital-intelligent empowerment", optimizing the talent training ecosystem via "collaborative education", and constructing a diversified quality system by means of "classified development". By leveraging technological empowerment to enhance the efficiency of education and teaching, and integrating high-quality resources through collaborative linkage, this paper aims to advance the high-quality development of postgraduate education and contribute to the construction of a strong education country and a strong science and technology country.

Keywords: Digital-Intelligent Empowerment; Collaborative Drive; High-Quality Development; Governance Modernization

I. INTRODUCTION

With the widespread penetration of digital and intelligent technologies such as 5G, artificial intelligence, and big data, and the continuous growth in the nation's demand for innovative and high-level talents, the strategic significance and development imperatives of postgraduate education have undergone profound transformations. The "2025 National Postgraduate Admissions Investigation Report" indicates that the number of applicants for the national master's degree entrance examination in 2025 reached 3.88 million. Nevertheless, despite the "scale expansion," there is a pressing need to enhance the alignment between the quality of talent cultivation and the requirements of national strategies and industrial development^[1-3]. On one hand, traditional postgraduate education governance, which relies on manual statistics and experience-driven decision-making, struggles to precisely identify and address the critical issues during the cultivation process. On the other hand, the lack of effective collaboration among key stakeholders in education, including universities, enterprises, and research institutions, has resulted in a situation where the development of postgraduate students' practical capabilities and innovative thinking lags behind the actual requirements. In this context, exploring the integration of digital and intelligent empowerment with collaborative drivers has emerged as the central theme for overcoming the

challenges in postgraduate education development and attaining high-quality growth^[4-6].

II. CHALLENGES FACED BY THE CURRENT DEVELOPMENT OF POSTGRADUATE EDUCATION

In the context of the traditional governance model of postgraduate education, data related to various aspects such as enrollment, cultivation, scientific research, and employment are dispersed among different departments, thereby forming "information silos." For example, within universities, the Graduate School, the Academic Affairs Office, and the Scientific Research Department respectively possess data regarding postgraduate training plans, course grades, and scientific research achievements. However, due to the lack of unified data standards and a sharing mechanism, it remains challenging to construct a comprehensive portrait of postgraduate development. Moreover, governance decision-making predominantly relies on periodic reports and manual analysis. This approach makes it arduous to monitor issues in the cultivation process in real time. For instance, problems such as a persistent decline in the passing rate of certain postgraduate courses or insufficient participation in scientific research often remain unnoticed until one or two semesters later. By then, the optimal opportunity for improvement has often passed.

In the meantime, the update pace of some course contents is rather slow, failing to align with the industrial demands of the digital and intelligent era. In many institutions of higher learning, postgraduate courses still predominantly feature theoretical lectures and lack interdisciplinary elements such as "Artificial Intelligence + Specialization" and "Big Data + Research Methodology." Consequently, the knowledge systems acquired by postgraduate students struggle to meet the requirements of cutting-edge technologies and industrial upgrading. The practical component of postgraduate education is sometimes reduced to a mere formality, and the collaborative education mechanism remains underdeveloped^[7-9]. Although the majority of universities have entered into cooperation agreements with enterprises, due to ambiguous profit distribution and responsibility demarcation, enterprises lack sufficient incentives to actively participate in talent cultivation. As a result, postgraduate internships often only involve "visits and learning," making it difficult for students to engage deeply in the research and development of actual projects. Consequently, the cultivation of innovative practical capabilities yields suboptimal results.

At present, the quality assessment of postgraduate education primarily centers on academic achievements as the

core metrics, such as the number of published papers and the level of participation in scientific research projects. This approach inadequately evaluates the practical skills and professional qualities of professional postgraduate students. Such a "one-size-fits-all" evaluation criterion not only fails to capture the scientific research and innovation potential of academic postgraduate students but also falls short of reflecting the practical application capabilities of professional postgraduate students. This has led to a disconnect between the cultivation direction and objectives of postgraduate education. Specifically, some academic postgraduate students lack in-depth research capabilities, while professional postgraduate students struggle to meet the enterprises' requirements for "ready-to-use" talents. Ultimately, this situation impacts the supply-demand matching degree of the employment structure.

III. PATHS FOR THE HIGH-QUALITY DEVELOPMENT OF POSTGRADUATE EDUCATION DRIVEN BY DIGITAL-INTELLIGENT EMPOWERMENT AND COLLABORATION

A. Digital-Intelligent Empowerment: Promoting the Modernization of Postgraduate Education Governance

Integrate data across all aspects of postgraduate education, including enrollment, cultivation, research, and employment. Formulate unified data standards and sharing rules to create precise profiles tailored to each individual postgraduate. For example, by leveraging big data analysis to understand postgraduate students' preferences in course selection and their involvement in research activities, suitable research projects can be recommended for academic postgraduate students, while professional postgraduate students can be matched with appropriate enterprise internship opportunities. This approach enhances the specificity of postgraduate training.

Meanwhile, artificial intelligence algorithms can be employed to monitor the entire cultivation process in real time. For instance, through the analysis of factors such as postgraduate students' course attendance, the quality of assignment completion, and the progress of research achievements, students at "high risk" (e.g., those at risk of failing courses or experiencing research setbacks) can be automatically identified. Customized improvement plans can then be promptly provided. Additionally, in light of the dynamic changes in industrial demands and employment data, intelligent adjustments can be made to the enrollment scale of different majors and the curriculum setup. This transformation marks the shift of governance decision-making from an "experience-driven" to a "data-driven" model.

B. Collaborative Drive: Optimizing the Ecosystem of Postgraduate Education

Establish a trinity collaborative mechanism involving "universities, research institutions, and enterprises". Clearly define the rights, responsibilities, and benefit distribution models for each entity. Universities are tasked with providing core theoretical instruction and cultivating academic capabilities. Research institutions should offer support for cutting-edge research projects, and enterprises are responsible for practical teaching and nurturing professional qualities^[10]. For example, a university's computer science program collaborates with an artificial intelligence enterprise. Real-world R & D projects from the enterprise are translated into teaching cases for postgraduate courses. Under the joint guidance of university supervisors and enterprise engineers,

postgraduate students complete project development. This not only enhances students' practical skills but also reserves suitable talents for the enterprise. In response to the complex problem-solving requirements of the digital intelligence era, break down disciplinary boundaries and assemble cross-disciplinary supervisor teams. For example, in a cross-disciplinary postgraduate training program integrating "artificial intelligence and biomedicine", supervisors from the School of Computer Science, the School of Life Sciences, and hospital experts jointly guide students. This encourages postgraduate students to apply digital intelligence technologies to address practical issues such as medical image analysis and drug development, thereby fostering interdisciplinary and innovative talents.

C. Classified Development: Constructing a Diversified Quality Evaluation System

Formulate tailored training plans. For academic postgraduate students, place emphasis on cultivating research thinking and innovation capabilities. Introduce courses such as "Research Methodology" and "Academic Norms and Ethics" to guide students in mastering fundamental research methods and academic writing norms^[11]. For professional postgraduate students, the goal is to cultivate practical and application-oriented talents. Highlight the development of practical skills and professional qualities. Design a curriculum system that is guided by industry requirements and strengthen practical components to ensure a precise alignment between training objectives and professional needs^[12]. Establish classified evaluation criteria. The quality evaluation of academic postgraduate students should focus on their potential for research innovation. Core evaluation indicators may include the quality of research papers and the potential for translating research findings into practical applications. For professional postgraduate students, the emphasis should be on practical application capabilities. Key evaluation indicators can include the extent of contributions to enterprise projects and the evaluations provided by employers.

CONCLUSION

Digital intelligence empowerment offers technical underpinnings for the modernization of postgraduate education governance, while collaborative drive infuses impetus into the optimization of the educational ecosystem. The profound integration of these two elements is pivotal in facilitating the transformation of postgraduate education from mere scale expansion to a significant elevation in quality. Looking ahead, it is imperative to further dismantle institutional barriers, intensify the application of technologies, and integrate premium resources. This will enable the establishment of a novel postgraduate education ecosystem that seamlessly combines digital intelligence and collaboration. By doing so, we can nurture a greater number of innovative high-level talents who are well-suited to the demands of the digital intelligence era, thereby making substantial contributions to the development of a nation renowned for its educational excellence and technological prowess.

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