

Research on the Implementation Path of Vocational Undergraduate Education Serving Industrial Development in Jiujiang from the Perspective of Industry-Education Integration

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Abstract: *Against the background of industrial digital transformation and high-quality regional economic development, the importance of vocational undergraduate education in serving local industrial development has continued to increase. From the perspective of industry-education integration, this study takes Jiujiang City as the research object and investigates the practical foundation, existing problems, and optimization paths of vocational undergraduate education serving industrial development through questionnaire surveys, interviews, and case analysis. The results show that vocational undergraduate education in Jiujiang has established a certain foundation in professional development, practical teaching, and school-enterprise cooperation. However, there are still some problems, such as insufficient alignment between professional programs and industrial needs, inadequate integration between practical teaching and real industrial scenarios, and insufficient depth of collaborative school-enterprise talent cultivation. To further enhance the capacity of vocational undergraduate education to serve local industrial development, this study proposes optimization paths including the construction of an industry demand-oriented talent cultivation system, a school-enterprise collaborative practical education system, a digital capability system, and a government-school-enterprise collaborative support mechanism. The findings can provide references for local vocational undergraduate institutions to deepen industry-education integration and improve their capacity to serve regional industrial development.*

Keywords: Industry-education integration; Vocational undergraduate education; Regional industrial development; School-enterprise collaboration; Digital transformation.

1. INTRODUCTION

At present, vocational undergraduate education in China is undergoing a transformation from scale expansion to connotative development. With the continuous advancement of a new round of technological revolution and industrial transformation, industries such as intelligent manufacturing, the digital economy, and modern logistics are developing rapidly, resulting in increasing demand for high-level technical and skilled talents as well as interdisciplinary applied talents. Existing studies have shown that industrial digital transformation is reshaping enterprise competency requirements, and vocational education systems need to optimize talent cultivation models in response to industrial technological changes (Spöttl & Windelband, 2021; Islam et al., 2022). In this context, vocational undergraduate education not only undertakes the important task of cultivating high-level technical and skilled talents, but also faces the practical requirement of improving its capacity to serve regional industrial development.

Industry-education integration is an important pathway for vocational undergraduate education to serve industrial development. In recent years, China has continuously promoted the construction of a modern vocational education system, emphasizing that vocational education should actively align with industrial needs and promote the coordinated development of the education chain and industrial chain. Relevant studies have pointed out that deep integration between vocational education and industrial development can be achieved through curriculum co-development, practical platform construction, and collaborative school-enterprise talent cultivation (Li, 2024; Guan, 2025). Particularly in the context of industrial digital transformation, enterprises increasingly emphasize students' practical abilities, digital application capabilities, and abilities to solve complex practical problems, which places higher demands on professional development, practical teaching, and school-enterprise collaboration in vocational undergraduate education.

Jiujiang is an important industrial city in Jiangxi Province and a key node city in the Yangtze River Economic Belt. In recent years, Jiujiang has continuously promoted industrial structure optimization around the construction of a

manufacturing powerhouse, regional shipping center development, and industrial transformation and upgrading, gradually forming an industrial development pattern supported by petrochemical industries, new materials, equipment manufacturing, electronic information, port logistics, and the digital economy. As industries continue to develop toward high-end, intelligent, and green directions, enterprises' demand for digital management talents, intelligent manufacturing talents, and modern logistics talents is continuously increasing. This also requires vocational undergraduate education in Jiujiang to more actively connect with local industrial chains, job chains, and innovation chains, thereby continuously improving the alignment between talent cultivation and industrial needs.

However, from the current practical situation, vocational undergraduate education in Jiujiang still faces several shortcomings in serving local industrial development. For example, some professional programs are not sufficiently aligned with the needs of key local industries, practical teaching is not closely connected with real industrial scenarios, and collaborative mechanisms for enterprises' deep participation in talent cultivation remain inadequate. Based on this, from the perspective of industry-education integration, this study combines questionnaire surveys, interview investigations, and case analysis to examine the practical foundation and existing problems of vocational undergraduate education serving industrial development in Jiujiang, and further explores optimization paths for vocational undergraduate education to serve local industrial development. The study aims to provide references for local vocational undergraduate institutions to deepen industry-education integration and improve their capacity to serve industrial development.

2. THEORETICAL FOUNDATION AND LITERATURE REVIEW

2.1 Theory of Industry-Education Integration

Industry-education integration is an important concept in the construction of a modern vocational education system and also serves as a core pathway for vocational education to support regional industrial development. Its essence lies in promoting coordinated interaction between the education system and the industrial system. Through effective alignment between the talent cultivation process and industrial demands, industry-education integration aims to realize the integration and sharing of educational, industrial, and innovation resources, thereby improving the quality of technical and skilled talent cultivation. Compared with traditional school-enterprise cooperation, industry-education integration places greater emphasis on the deep integration of the education chain, talent chain, industrial chain, and innovation chain. It highlights enterprises' deep participation in professional development, curriculum design, practical teaching, and talent evaluation, thereby promoting a collaborative operational mechanism between schools and enterprises for joint talent cultivation and coordinated development.

Existing studies have shown that vocational education has a strong industrial orientation, and its professional programs, curriculum systems, and talent cultivation directions need to dynamically adapt to changes in regional industrial structures (Rauner & Maclean, 2008). With the continuous development of Industry 4.0 and the digital economy, vocational education has gradually shifted from traditional skill training toward comprehensive vocational competence cultivation, placing greater emphasis on practical abilities, digital competencies, and complex problem-solving capabilities (Spöttl & Windelband, 2021). Billett (2011) pointed out that vocational competence formation depends not only on school education, but also on practical learning in real work environments. Work-integrated learning theory also suggests that students' learning experiences in authentic industrial settings play an important role in improving vocational competence and job adaptability (Jackson, 2015).

Against the background of industrial digital transformation, enterprises' demands for talent competency structures are also changing. Islam et al. (2022) argued that industrial digital upgrading is continuously increasing enterprises' demand for digital skills, interdisciplinary collaboration capabilities, and technological application abilities. Tee et al. (2024) further noted that enterprises currently pay greater attention to graduates' digital skills, innovation capabilities, and practical job adaptability. Therefore, as a higher-level type within the vocational education system, vocational undergraduate education needs to rely on industry-education integration to promote reforms in talent cultivation models. By embedding real industrial scenarios into the teaching process, vocational undergraduate education can improve students' practical abilities, technological application capabilities, and abilities to solve complex practical problems.

2.2 Research on Vocational Undergraduate Education Serving Industrial Development

With the rapid development of vocational undergraduate education, scholars have conducted extensive research on vocational undergraduate education positioning, school-enterprise collaborative talent cultivation, and serving regional industrial development.

In terms of the positioning of vocational undergraduate education, existing studies generally argue that vocational undergraduate education differs from general undergraduate education in that its core characteristics lie in emphasizing vocationality, technicality, and applicability, while paying greater attention to the effective alignment between talent cultivation and industrial demands (Moodie, 2008). Some studies have pointed out that vocational undergraduate education should focus on cultivating high-level technical and skilled talents and improve students' abilities to serve industrial development through strengthening practical teaching and technological application training (Wheelahan, 2015). Meanwhile, some researchers believe that vocational undergraduate education should not only focus on vocational skill cultivation, but also emphasize the improvement of students' innovation capabilities, job mobility capabilities, and lifelong learning abilities to meet enterprises' demand for interdisciplinary talents under industrial upgrading (Cedefop, 2020).

Regarding industry-education integration and school-enterprise collaborative talent cultivation, existing studies mainly focus on school-enterprise cooperation models, practical teaching systems, and collaborative education mechanisms. Billett (2014) argued that an important foundation for improving vocational education quality is enterprises' deep participation in the talent cultivation process, thereby realizing effective integration between school education and workplace learning. Jackson (2015) pointed out that practical learning in authentic industrial scenarios can effectively improve students' vocational competence and employability. Some studies have also proposed that vocational institutions should strengthen collaboration with local leading enterprises, industrial parks, and industry organizations. Through jointly developing talent cultivation plans, collaboratively designing curricula, and co-building practical platforms, vocational institutions can achieve precise alignment between talent cultivation and job demands (Avis, 2018).

In terms of vocational education serving regional industrial development, related studies mainly focus on how vocational education supports regional industrial transformation and upgrading and contributes to local economic development. Some studies argue that vocational education should actively align with regional key industries and strategic emerging industries, optimize professional layouts around industrial chains, and enhance the alignment between talent cultivation and local industrial structures (OECD, 2021). Particularly in the context of intelligent manufacturing, the digital economy, and industrial digital transformation, talent cultivation models, practical teaching systems, and professional development directions in vocational education all require corresponding adjustments (UNESCO-UNEVOC, 2021). In addition, some studies have emphasized that vocational undergraduate education should further strengthen the construction of "dual-qualified" teacher teams, digital practice platforms, and technical service capabilities in order to enhance its ability to serve industrial digital transformation.

Overall, existing studies provide important theoretical foundations for vocational undergraduate education to serve industrial development. However, most studies mainly analyze issues from the perspectives of national policies, general vocational education reform, or school-enterprise cooperation models. Research on how local vocational undergraduate education can achieve deep industry-education integration based on regional industrial characteristics remains relatively insufficient. Furthermore, existing studies lack systematic analyses based on regional practices regarding the practical problems, operational mechanisms, and implementation paths of vocational undergraduate education serving local industrial development, especially research focusing on the collaborative development between vocational undergraduate education and local industries under the industrial structure background of prefecture-level cities.

2.3 Research Review

Overall, existing studies generally affirm the important role of industry-education integration in vocational education serving industrial development. Rich discussions have been conducted on talent cultivation positioning, school-enterprise collaborative education, and regional economic development in vocational undergraduate education, providing important theoretical foundations for vocational education reform and industrial collaboration. However, several shortcomings still exist in the current literature.

First, existing studies mainly focus on national vocational education reform, general school-enterprise cooperation models, or macro-level policy analysis. Research on how vocational undergraduate education serves regional key

industries under the industrial structure background of prefecture-level cities remains relatively insufficient, and there is a lack of practical studies integrating local industrial characteristics and regional economic demands. Second, existing research on industry-education integration mainly focuses on general school-enterprise cooperation, while insufficient attention has been paid to collaborative mechanisms involving enterprises' deep participation in professional development, curriculum design, practical teaching, and talent evaluation throughout the entire educational process, especially systematic analyses at the vocational undergraduate education level. In addition, under the background of industrial digitalization and intelligent transformation, enterprises' demand for interdisciplinary, digital, and high-level technical and skilled talents is continuously changing. However, existing studies on how vocational undergraduate education can adapt to industrial digital transformation trends, improve digital talent cultivation capabilities, and enhance its capacity to support industrial digital transformation still require further exploration.

Based on this, taking Jiujiang City as the research object and from the perspective of industry-education integration, this study combines regional industrial development demands with vocational undergraduate education practices. Through questionnaire surveys, interviews, and case analysis, the study analyzes the practical foundation and existing problems of vocational undergraduate education serving local industrial development and further explores optimization pathways for vocational undergraduate education to support regional industrial development. This study attempts to provide practical references for local vocational undergraduate institutions to deepen industry-education integration and improve their capacity to serve local industrial development from the perspective of coordinated development between regional industrial demands and vocational undergraduate education.

3. PRACTICAL FOUNDATION AND INVESTIGATION ANALYSIS OF VOCATIONAL UNDERGRADUATE EDUCATION SERVING INDUSTRIAL DEVELOPMENT IN JIUJIANG

3.1 Research Design and Data Sources

To further understand the current situation of vocational undergraduate education serving industrial development in Jiujiang, this study adopted a combination of questionnaire surveys, interviews, and case analysis. The investigation was conducted from March to April 2026. The respondents mainly included teachers and students from vocational undergraduate institutions in Jiujiang, as well as enterprise managers and technical personnel from manufacturing, port logistics, and digital service industries. The survey focused on industrial talent demands, professional development, practical teaching, school-enterprise cooperation, and the role of vocational undergraduate education in serving local industrial development.

A total of 260 questionnaires were distributed, and 223 valid questionnaires were collected, including 152 student questionnaires, 31 teacher questionnaires, and 40 enterprise questionnaires. The questionnaire was designed using a five-point Likert scale, and interview materials and case materials were combined for comprehensive analysis to improve the objectivity and authenticity of the research results.

Table 1: Basic Information of Survey Samples

Respondents	Number	Percentage (%)
Students	152	68.2
Teachers	31	13.9
Enterprise personnel	40	17.9
Total	223	100

3.2 Changes in Local Enterprise Talent Demands under Industrial Upgrading

In recent years, with the digital transformation of manufacturing industries, the upgrading of port logistics, and the continuous development of the digital economy in Jiujiang, the demand structure for high-level technical and skilled talents in local industries has undergone significant changes. The survey results indicate that most enterprises believe the most urgently needed talents are no longer traditional single-skilled workers, but interdisciplinary talents possessing professional technical competence, digital application capabilities, and job adaptability.

Enterprises pay greater attention to practical operational abilities, digital technology application capabilities, and

problem-solving abilities. More than 80% of enterprises indicated that students' ability to quickly adapt to real work scenarios has become an important consideration in recruitment. Some enterprises noted in interviews that although some graduates possess certain theoretical knowledge, they still lack competence in digital system applications, intelligent equipment operation, and understanding enterprise business processes.

In addition, with the continuous development of port logistics, intelligent manufacturing, and enterprise digital management in Jiujiang, the demand for digital management talents, modern logistics talents, and intelligent manufacturing talents is continuously increasing. This indicates that local industrial upgrading has placed new requirements on the talent cultivation direction and competency structure of vocational undergraduate education.

Table 2: Survey Results of Enterprise Talent Competency Demands

Competency Type	Percentage (%)
Practical operational ability	85.0
Digital technology application ability	81.3
Practical problem-solving ability	78.5
Teamwork ability	74.6
Innovation ability	63.2

3.3 Practical Foundation of Vocational Undergraduate Education Serving Industrial Development

With the continuous advancement of vocational undergraduate education reform, vocational undergraduate institutions in Jiujiang have gradually established a certain foundation in professional development, practical teaching, and school-enterprise cooperation. In terms of professional development, some institutions have gradually optimized their professional structures around local key industries by strengthening programs related to intelligent manufacturing, modern logistics, e-commerce, digital management, and information technology, thereby enhancing the alignment between professional layouts and local industrial development.

In terms of practical teaching, vocational undergraduate institutions have continuously strengthened practical teaching systems through the construction of on-campus training bases, industrial colleges, and off-campus practice platforms, thereby improving students' practical abilities and job adaptability. Survey results show that more than 70% of students believe that practical teaching greatly helps improve job-related competencies, indicating that practical teaching has become an important component of vocational undergraduate education.

In terms of social services, some vocational undergraduate institutions have begun participating in local enterprise digital transformation and technical services by relying on scientific research platforms, doctoral teams, and technology service teams. For example, some institutions have provided support for enterprise transformation and upgrading by carrying out technical services related to enterprise digital management, intelligent manufacturing, and production optimization. This demonstrates that the capacity of vocational undergraduate education to serve local industrial development is gradually improving.

3.4 Current Situation of School-Enterprise Cooperation and Practical Teaching

The survey results show that vocational undergraduate institutions in Jiujiang have generally established school-enterprise cooperation, mainly including student internships, off-campus practice base construction, order-oriented training, and enterprise lectures. Most students have participated in enterprise practices or internships, indicating that school-enterprise cooperation has already established a certain foundation.

However, according to the survey results, current school-enterprise cooperation is still mainly at a superficial level, and enterprises' participation in talent cultivation remains limited. Although some enterprises participate in student internships and employment cooperation, their involvement in curriculum development, talent cultivation plan formulation, and project-based teaching is still insufficient. Meanwhile, some enterprises pay more attention to short-term labor demands and lack long-term investment in talent cultivation.

Regarding practical teaching, there remains a gap between some practical teaching content and real industrial scenarios. Some students indicated that practical courses are still mainly limited to basic training, with limited exposure to enterprise digital systems, intelligent equipment, and real business processes. During internships, some students mainly engage in auxiliary work and have limited opportunities to participate in real projects and core business operations.

In addition, some teachers lack enterprise practical experience and have insufficient understanding of the latest industrial technologies and enterprise operational models, which also affects the alignment between practical teaching content and industrial development.

Table 3: Major Problems in Current Vocational Undergraduate Education

Problem Type	Enterprise Recognition (%)	Student Recognition (%)
Insufficient integration between practical teaching and real industrial scenarios	78.4	72.1
Insufficient depth of school-enterprise cooperation	74.3	65.8
Slow updating of professional curriculum content	69.5	63.7
Insufficient cultivation of digital practical abilities	66.8	68.4
Insufficient enterprise participation in talent cultivation	61.2	—

3.5 Typical Case Analysis

In the process of vocational undergraduate education serving local industrial development, some institutions have begun exploring new models of collaborative school-enterprise services for industrial digital transformation. Taking a new material manufacturing enterprise in Jiujiang as an example, the enterprise had long relied on traditional manual management models in production scheduling, data management, and production coordination. With the expansion of enterprise orders and the advancement of digital transformation, traditional management methods could no longer meet development needs.

To address problems encountered during digital transformation, research teams from vocational undergraduate institutions, relying on school-enterprise cooperation platforms, jointly carried out digital diagnosis and technical services with the enterprise. By participating in intelligent production scheduling optimization, production data integration, and digital management process improvement, the teams helped improve the enterprise's production efficiency and management level. Meanwhile, the enterprise also provided students with authentic industrial practice scenarios, enabling them to gain exposure to enterprise digital operation processes and intelligent manufacturing application scenarios.

This case demonstrates that vocational undergraduate education can not only serve local industrial development through talent cultivation, but can also participate in local enterprise digital transformation through research platforms and school-enterprise cooperation mechanisms, thereby realizing the coordinated linkage among talent cultivation, technical services, and industrial development. This also provides a practical foundation for further deepening industry-education integration and enhancing the capacity of vocational undergraduate education to serve local industrial development.

4. OPTIMIZATION PATHS FOR VOCATIONAL UNDERGRADUATE EDUCATION SERVING INDUSTRIAL DEVELOPMENT FROM THE PERSPECTIVE OF INDUSTRY-EDUCATION INTEGRATION

4.1 Constructing an Industry Demand-Oriented Talent Cultivation System

The core of vocational undergraduate education serving local industrial development lies in the effective alignment between talent cultivation and industrial demands. With the digital transformation of manufacturing industries, the upgrading of port logistics, and the rapid development of the digital economy in Jiujiang, local industries' requirements for talent competency structures are shifting from traditional single-skilled talents toward interdisciplinary, digital, and application-oriented talents. Therefore, vocational undergraduate institutions should focus on local key industrial development directions and construct an industry demand-oriented talent cultivation system to continuously improve the alignment between talent cultivation and regional industrial development.

First, institutions should establish a dynamic adjustment mechanism for professional programs by optimizing professional layouts around key fields such as intelligent manufacturing, modern logistics, enterprise digital management, and supply chain management, thereby promoting the coordinated development between professional structures and regional industrial structures. Second, curriculum systems should be further optimized by integrating digital technology applications, intelligent equipment operations, data analysis, and real enterprise cases into course content to ensure synchronization between curriculum development and industrial technological

progress. In addition, interdisciplinary integration should be strengthened by exploring interdisciplinary talent cultivation models such as “technology + management,” “logistics + digitalization,” and “manufacturing + informatization.” This can improve students’ comprehensive practical abilities and job adaptability, thereby better meeting local industries’ demands for high-level technical and skilled talents under industrial upgrading.

4.2 Constructing a School-Enterprise Collaborative Practical Education System

Practicality and vocational orientation are important characteristics of vocational undergraduate education, while school-enterprise collaboration is an important approach to improving the quality of practical education. Currently, some school-enterprise cooperation still remains at the superficial level of internships, employment cooperation, and practice base construction, while enterprises’ participation throughout the entire talent cultivation process remains insufficient. Therefore, it is necessary to further promote school-enterprise collaborative education mechanisms and establish a long-term mechanism for schools and enterprises to jointly cultivate high-level technical and skilled talents.

On the one hand, enterprises should be encouraged to deeply participate in the formulation of talent cultivation plans. Based on enterprises’ competency requirements for job positions, schools and enterprises can jointly determine curriculum systems and competency standards to enhance the relevance and practicality of talent cultivation. On the other hand, curriculum co-development mechanisms should be strengthened by inviting enterprise technicians and industry experts to participate in the teaching process, integrating real enterprise projects, authentic cases, and industry standards into classroom teaching to improve the alignment between teaching content and industrial demands.

Meanwhile, diversified education models such as order-oriented training, project-based teaching, modern apprenticeship systems, and industrial colleges should be actively explored to help students improve their practical abilities and job adaptability in authentic industrial environments. In fields such as intelligent manufacturing, port logistics, and enterprise digital management, the construction of joint school-enterprise practice platforms, enterprise studios, and innovation practice bases can further promote the deep integration between teaching processes and enterprise production processes.

4.3 Constructing a Capability System for Serving Industrial Digital Development

At present, digital transformation has become an important direction for local industrial upgrading, and vocational undergraduate education must actively adapt to industrial digital development demands and continuously improve its capability to support industrial digital transformation.

First, digital curriculum systems should be strengthened by incorporating industrial internet, data analysis, intelligent manufacturing, digital operations, and digital supply chain management into professional courses to improve students’ digital technology application capabilities. Second, digital teaching resources and practice platforms should be enhanced through the construction of intelligent training platforms, digital laboratories, and virtual simulation practice platforms, thereby providing students with digital learning environments that are more closely aligned with industrial development.

At the same time, vocational undergraduate institutions should actively participate in local enterprises’ digital transformation practices. By relying on scientific research platforms, doctoral teams, and technology service teams, institutions can provide enterprises with services such as digital diagnosis, intelligent manufacturing optimization, and management digital upgrading, thereby realizing coordinated development among talent cultivation, scientific research services, and industrial development. In addition, students’ innovation and practical abilities should be strengthened by encouraging participation in real enterprise digital projects, thereby improving students’ abilities to solve complex practical problems.

4.4 Constructing a Collaborative Development System for “Dual-Qualified” Teachers

The teaching staff is an important guarantee for deepening industry-education integration in vocational undergraduate education. Currently, some teachers lack enterprise practical experience and have insufficient understanding of the latest industrial technologies and enterprise operational models, which affects the effectiveness of practical teaching to a certain extent. Therefore, it is necessary to further strengthen the construction of “dual-qualified” teacher teams and improve teachers’ capabilities to serve local industrial

development.

First, institutions should establish enterprise practice systems for teachers by encouraging teachers to regularly participate in enterprise technical services, production practices, and project research and development activities, thereby enhancing their understanding of industrial development trends and enterprise competency demands. Second, industry technicians, engineers, and enterprise managers should be actively introduced into teaching activities to establish joint school-enterprise teaching teams and improve the practicality and industry relevance of teaching content.

At the same time, teachers should also be encouraged to conduct applied research and technical services around local industrial development demands, promoting the integration between research achievements and practical enterprise needs and continuously improving vocational undergraduate education's capability to serve local industrial development.

4.5 Constructing a Government-School-Enterprise Collaborative Support System

Vocational undergraduate education serving local industrial development is a systematic project that requires the establishment of a long-term collaborative mechanism among governments, schools, and enterprises. Therefore, it is necessary to further improve the government-school-enterprise collaborative support system and provide institutional support for deepening industry-education integration.

At the government level, policy guidance and resource support should be strengthened by establishing a promotion mechanism for the coordinated development of vocational undergraduate education and regional industries based on local key industrial development demands. Greater support should be provided for industrial colleges, practical platforms, and school-enterprise cooperation projects. At the same time, incentive mechanisms for industry-education integration should be improved to enhance enterprises' enthusiasm for participating in vocational education.

At the school level, institutions should further strengthen their orientation toward serving local development, actively connect with local industrial development demands, strengthen cooperation with enterprises, industry associations, and industrial parks, and establish normalized communication mechanisms between schools and enterprises to improve the capability of vocational undergraduate education to serve industrial development.

At the enterprise level, enterprises should enhance their awareness of participating in vocational education by actively engaging in professional development, curriculum design, practical teaching, and talent evaluation, thereby promoting the integration of enterprise resources into the talent cultivation process and realizing collaborative and mutually beneficial development between enterprises and talent cultivation.

By constructing a collaborative development mechanism guided by the government, led by schools, and participated in by enterprises, the deep integration among the education chain, talent chain, industrial chain, and innovation chain can be further promoted, thereby continuously improving the overall effectiveness of vocational undergraduate education serving industrial development in Jiujiang.

5. CONCLUSION AND FUTURE PROSPECTS

5.1 Research Conclusions

Against the background of industrial digital transformation and high-quality regional economic development, the importance of vocational undergraduate education in serving local industrial development has continued to increase. From the perspective of industry-education integration and based on the industrial development conditions of Jiujiang, this study investigated the practical foundation, existing problems, and optimization paths of vocational undergraduate education serving industrial development through questionnaire surveys, interviews, and case analysis.

The results show that with the digital transformation of manufacturing industries, the upgrading of port logistics, and the continuous development of the digital economy in Jiujiang, local industries' demand for high-level technical and skilled talents, digital management talents, and interdisciplinary applied talents is continuously increasing. At present, vocational undergraduate education in Jiujiang has established a certain foundation in

professional development, practical teaching, school-enterprise cooperation, and social services, and has played a positive role in serving local industrial development. Some vocational undergraduate institutions have already begun optimizing professional layouts around local key industries and participating in local industrial transformation and upgrading through industrial college construction, practical teaching reform, and technical service activities.

However, according to the survey results, there is still a certain gap between vocational undergraduate education and local industrial demands. The main problems include insufficient alignment between professional development and industrial demands, insufficient depth of collaborative school-enterprise education, inadequate integration between practical teaching and real industrial scenarios, and insufficient capability to support industrial digital development. These problems have, to some extent, affected the effectiveness of vocational undergraduate education in serving local industrial development and also reflect the need for further improvement in talent cultivation systems, practical education systems, and collaborative support mechanisms.

Based on the investigation analysis and practical problem analysis, this study argues that deepening industry-education integration is an important pathway for improving the capability of vocational undergraduate education to serve local industrial development. Vocational undergraduate institutions should further focus on local key industrial development directions, construct industry demand-oriented talent cultivation systems, deepen school-enterprise collaborative practical education mechanisms, strengthen digital capability construction, improve the development system of “dual-qualified” teachers, and further enhance government-school-enterprise collaborative support mechanisms. Through promoting the deep integration among the education chain, talent chain, industrial chain, and innovation chain, vocational undergraduate education can continuously improve its capability to support the high-quality development of regional industries.

5.2 Future Prospects

With the rapid development of industrial digitalization and intelligent transformation, the connotations and pathways of vocational undergraduate education serving local industrial development will continue to deepen. Future studies can further expand the scope of investigation and strengthen comparative research on vocational undergraduate education serving industrial development under different regional and industrial backgrounds, thereby improving the generalizability and practical value of research conclusions.

At the same time, future research can further explore digital talent cultivation models, school-enterprise collaborative innovation mechanisms, and specific pathways for vocational undergraduate education to support industrial digital transformation in emerging fields such as intelligent manufacturing, port logistics digitalization, and enterprise digital management. In addition, empirical research methods can also be adopted to conduct more in-depth studies on the influencing mechanisms and implementation effects of vocational undergraduate education serving local industrial development, thereby providing more systematic theoretical and practical references for vocational undergraduate education reform and coordinated regional industrial development.

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