GUIDELINE FOR TEACHERS' PROFESSIONAL COMPETENCE DEVELOPMENT OF HIGHER VOCATIONAL COLLEGES IN QINZHOU CITY

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ARTICLE HISTOR
Received: 4 August 2026 **Revised:** 10 August 2026 **Published:** 28 August 2026

ABSTRACT

This study investigates the guideline for teachers' professional competence development of higher vocational colleges in Qinzhou City, Guangxi Zhuang Autonomous Region, China. A mixed research method was employed, combining quantitative questionnaire data collected from 191 teachers and qualitative in-depth interviews with five key informants. The study examines six dimensions of teachers' professional competence: teaching ability, practical ability, research capacity, innovation capability, professional literacy, and digital literacy. The findings reveal that the overall level of teachers' professional competence is at a moderate level (M = 3.40, S.D. = 0.87). Among the six dimensions, teaching ability achieved the highest mean score (M = 3.67), at a high level, while research capacity showed the lowest mean score (M = 3.18), at a moderate level. Teaching ability and professional literacy were rated at a high level, while practical ability, research capacity, innovation capability, and digital literacy were at a moderate level. The results indicate that while teachers have established a solid foundation in teaching and professional ethics, significant gaps remain in practical competence, research engagement, innovation, and digital integration. The interview findings reveal that teachers lack frontline enterprise experience, academic publication skills, and data-driven digital competencies. Based on the findings, the study proposes targeted guidelines including strengthening enterprise practice mechanisms, establishing research mentoring systems, promoting teaching innovation through interdisciplinary collaboration, enhancing lifelong learning awareness, and building systematic digital literacy training programs. These guidelines are intended to provide a theoretical and practical foundation for Qinzhou's higher vocational colleges to improve teachers' professional competence, thereby promoting the quality of vocational education and supporting regional industrial development.

Keywords: Teachers' Professional Competence; Higher Vocational Colleges; Professional Development; Qinzhou City

CITATION INFORMATION: Wang, X., & Siththada, T. (2026). Guideline For Teachers' Professional Competence Development of Higher Vocational Colleges in Qinzhou City. *Procedia of Multidisciplinary Research*, *4*(8), 60.

INTRODUCTION

In the era of rapid technological transformation and industrial upgrading, higher vocational education plays a critical role in cultivating skilled talents who meet the demands of regional economic development and emerging industries. As China advances its strategy of high-quality development and innovation-driven growth, vocational institutions are increasingly expected to strengthen their teaching quality, industry integration, and practical training systems. Within this context, teachers' professional competence has become a key determinant of institutional effectiveness and student employability (OECD, 2023). Professional competence in vocational education extends beyond subject knowledge to include pedagogical skills, industry experience, digital literacy, and the ability to integrate technology into teaching practices.

In recent years, China's Ministry of Education has emphasized the modernization and professionalization of vocational education teachers through national reform policies and competency-based standards (Ministry of Education [MOE], 2022). The integration of digital technologies, smart education systems, and industry–education collaboration further requires teachers to continuously update their competencies to remain aligned with evolving labor market needs (UNESCO, 2021). However, disparities in teacher development systems and professional support mechanisms still exist at the local level. In Qinzhou, higher vocational colleges face challenges related to structured professional development pathways, industry exposure opportunities, and systematic competency evaluation frameworks.

As a pivotal city on the New Western Land-Sea Corridor, Qinzhou is accelerating industrial upgrading by leveraging the China-ASEAN cooperation platform. The port-vicinity chemical industry, equipment manufacturing, and other industrial clusters have shown high-end and compound characteristics in their demand for technical and skilled talents. This requires teachers to have the ability to transform cutting-edge industrial technologies into teaching content. Nevertheless, the professional development of teachers in Qinzhou's higher vocational colleges lags behind industrial development, leading to a disconnect from the educational and economic development needs of the port-vicinity areas. Meanwhile, the proportion of "double-qualified" teachers who have frontline enterprise practical experience and can carry out practical teaching is relatively low. Most teachers lack job training related to port-vicinity industries, making it difficult for them to meet the job requirements of enterprises (Guo, 2024).

Against this backdrop, the professional development of teachers in Qinzhou's higher vocational colleges is entrusted with a dual mission: to respond to the global wave of educational digitalization and to root in local industrial needs. Qin and Zhou (2024) pointed out that in the context of digital transformation, teachers have problems such as vague digital awareness and limited transformation paths. Some teachers regard digital technology only as a tool rather than the core driving force for educational reform. Therefore, developing clear and strategic guidelines for teachers' professional competence development is essential to enhance teaching quality, institutional competitiveness, and sustainable regional development.

This study takes teachers in higher vocational colleges in Qinzhou as the research object to explore the current situation, dilemmas, and localized improvement paths of their professional competence development. The study systematically analyzes the current characteristics and practical dilemmas of teachers' professional competence development, combined with the policy orientation of vocational education in Guangxi, the development needs of Qinzhou's port-vicinity industries, and the trend of educational digital transformation.

Research Significance

First, this study contributes to the field of educational management by examining teachers' professional competence development from a school management perspective. By focusing on six dimensions — teaching ability, practical ability, research capacity, innovation capability,

professional literacy, and digital literacy — the study provides a comprehensive understanding of how professional competence influences teacher development in the context of vocational education. Second, the findings offer practical guidance for school administrators to design structured training programs, competency-based evaluation systems, and sustainable career development pathways. The proposed guidelines may also serve as a useful reference for other higher vocational colleges seeking to promote teacher development during educational digital transformation.

Research Objectives

(1) To study the level of teachers' professional competence of higher vocational colleges in Qinzhou City.

(2) To propose the guideline for teachers' professional competence development of higher vocational colleges in Qinzhou City.

LITERATURE REVIEW

Concepts and Theories of Professional Competence

The concept of vocational competence originated in vocational psychology and vocational education research in the mid-20th century, and its connotation has been continuously expanded with social and economic development. Early studies mostly regarded vocational competence as "the set of knowledge and skills required to perform specific occupational tasks" (Hodkinson & Issitt, 1995), whereas modern research emphasizes its situatedness and dynamism. In an educational context, vocational competence can be defined as "the comprehensive qualities possessed by an individual to effectively perform work tasks and achieve occupational goals in a specific occupational field," including both observable overt behavioral performance and implicit cognitive, affective, and attitudinal traits (Zhao, 2009).

Human capital theory emphasizes that vocational competence, as "specific human capital," yields a significantly higher return on investment than general education, particularly in high-end manufacturing and modern service industries (Cai, 2021). Based on this theory, teachers' professional competence constitutes important human capital in the education sector, directly determining the quality of instruction and influencing the accumulation of students' human capital. Sok and Heng (2024) empirically confirmed that teachers' professional competence — including subject knowledge, pedagogical skills, and student development capacity — is a core factor affecting students' academic performance.

Competency-Based Education (CBE) theory stresses differentiated instruction and practical teaching to enable students to improve vocational competence in authentic work settings (Smith, 2020). CBE has been widely applied in China's vocational education reform, whose core lies in reconstructing the curriculum system with vocational competence as the core. The "systematic curriculum of work process" model developed by Zhao (2021) realizes precise alignment between school education and enterprise needs through typical work task analysis, learning field design, and project-based teaching implementation.

Dimensions of Teachers' Professional Competence

Based on relevant theories and previous studies, this study identifies six core dimensions of teachers' professional competence. Teaching ability refers to teachers' capacity to design, deliver, and assess instructional activities effectively, including curriculum development and classroom management. Practical ability refers to teachers' professional skills and hands-on experience aligned with industry standards. Research capacity refers to teachers' ability to conduct scholarly or applied research and integrate research outcomes into teaching. Innovation capability refers to teachers' ability to generate creative ideas and develop innovative teaching methods. Professional literacy refers to teachers' ethical standards, professional attitudes, and

commitment to lifelong learning. Digital literacy refers to teachers' ability to effectively use digital technologies, smart education systems, and data-driven tools in teaching (UNESCO, 2018; Mishra & Koehler, 2006; Redecker, 2017).

Context of Higher Vocational Colleges in Qinzhou

Qinzhou has two higher vocational colleges: Qinzhou Preschool Education College (public) and Guangxi Yinghua International Vocational College (private), with a total enrollment of 15,400 students (Qinzhou Municipal People's Government, 2024). The city's industrial structure features port-oriented industries including green petrochemicals, new energy materials, marine equipment manufacturing, and electronic information. As the core hub of the New International Land-Sea Trade Corridor, Qinzhou has gradually formed 100-billion-level industrial clusters (Qinzhou Municipal People's Government, 2023).

However, previous studies indicate that vocational college teachers face multiple challenges. Tang (2020) conducted a survey among 162 vocational college teachers in Guangxi, revealing that only 3.7% of teachers expressed high satisfaction with their professional growth, while over 60% were unfamiliar with teacher development policies. Insufficient training, limited external exchanges, and superficial enterprise practice led to slow updates in professional knowledge. Wang et al. (2024) found that while 80.32% of dual-qualified teachers received certification, significant gaps remained in practical training and industry integration. These findings underscore the urgent need for systematic professional competence development in Qinzhou's higher vocational colleges.

Research Gap

Although many studies have explored teachers' professional competence development, most focus on individual competencies rather than integrated multi-dimensional frameworks. Furthermore, empirical studies focusing on higher vocational colleges in Qinzhou remain limited. Therefore, this study investigates teachers' professional competence development across six dimensions and proposes practical guidelines based on the local industrial context.

METHODOLOGY

Research Design

This study used a mixed-methods research design to investigate the guideline for teachers' professional competence development of higher vocational colleges in Qinzhou City. Quantitative data were collected through questionnaires to examine the current level of teachers' professional competence, while qualitative data were obtained through in-depth interviews to gain deeper insights into challenges and improvement strategies. The mixed-methods approach enabled a comprehensive understanding of both the current situation and practical needs related to teachers' professional competence development.

Population and Sample

The population consisted of 380 full-time faculty members from two higher vocational colleges in Qinzhou City: Qinzhou Preschool Education College and Guangxi Yinghua International Vocational College. Based on Krejcie and Morgan's (1970) sample size table for finite populations, 191 teachers were selected as the sample for the questionnaire survey using stratified random sampling. In addition, five key informants were selected through purposive sampling for in-depth interviews, comprising a deputy dean of the School of Education, a deputy director of the Teaching Quality Assurance Center, and three full-time teachers with at least three years of experience in higher vocational colleges.

Research Instruments

Two research instruments were used in this study. A five-point Likert scale questionnaire was developed to assess six dimensions of teachers' professional competence, with 8 items per

dimension (48 items total). The questionnaire was divided into two parts: Part 1 collected demographic information including gender, age, educational background, work experience, and professional title; Part 2 assessed the six competence dimensions using a 5-level estimation scale (5 = highest level, 1 = lowest level). An interview form was also created covering the same six dimensions, with questions focusing on management practices, existing challenges, and suggestions for improvement.

Validity and Reliability

The questionnaire was examined by three experts using the Item Objective Congruence (IOC) technique. The IOC values ranged from 0.67 to 1.00, indicating acceptable content validity. A pilot study involving 30 teachers was conducted to assess reliability. The overall Cronbach's Alpha coefficient was 0.918, indicating good reliability. The interview questions were reviewed and revised based on expert and supervisor recommendations to ensure consistency with the research objectives.

Data Collection

The researcher distributed the questionnaire to the sample group and collected data from 191 respondents through both in-person and online channels. Each questionnaire was checked for completeness before data encoding. In-depth interviews were conducted with five key informants, with each interview recorded and transcribed for analysis. The researcher collected opinions immediately at the end of each interview and summarized the findings for validation.

Data Analysis

Quantitative data were analyzed using descriptive statistics, including frequency, percentage, mean, and standard deviation. The interpretation criteria were: 4.51–5.00 = highest level; 3.51–4.50 = high level; 2.51–3.50 = moderate level; 1.51–2.50 = low level; 1.00–1.50 = lowest level. Qualitative interview data were analyzed using content analysis to identify key themes related to teachers' professional competence development and to formulate practical improvement guidelines.

RESULTS

Descriptive Statistical Results

The level of teachers' professional competence of higher vocational colleges in Qinzhou City was examined in six dimensions: teaching ability, practical ability, research capacity, innovation capability, professional literacy, and digital literacy. By analyzing the mean and standard deviation of the questionnaire data from 191 teachers, the results are shown in Table 1.

Table 1 Results of means and standard deviation analysis of teachers' professional competence

Teachers' Professional Competence	n = 191		Interpretation
	M	S.D.	
Teaching Ability	3.68	0.85	high level
Practical Ability	3.35	0.82	Moderate level
Research Capacity	3.21	0.88	moderate level
Innovation Capability	3.28	0.85	moderate level
Professional Literacy	3.62	0.78	high level
Digital Literacy	3.41	0.89	moderate level
Total	3.42	0.82	moderate level

Table 1 shows that the overall level of teachers' professional competence development is at a moderate level (M = 3.40, S.D. = 0.87). Among the six dimensions, teaching ability (M = 3.67)

and professional literacy (M = 3.65) were at a high level, while practical ability (M = 3.31), digital literacy (M = 3.36), innovation capability (M = 3.24), and research capacity (M = 3.18) were at a moderate level. The findings indicate that while teachers have established a solid foundation in teaching and professional ethics, significant gaps remain in practical experience, research capacity, innovation, and digital competency, which require targeted improvement.

Interview Results

On the basis of the questionnaire survey, in-depth interviews were conducted with five key informants with experience in vocational education teaching and teacher development. The purpose was to understand their attitudes and suggestions about the professional competence development of teachers in higher vocational colleges in Qinzhou City.

Teaching Ability

The five interviewees generally recognized the relatively high level of teaching ability, especially in curriculum design, classroom management, and student guidance. Ms. Li Xueting pointed out that curriculum content should be updated more frequently to reflect the rapid development of port-vicinity industries such as petrochemicals, equipment manufacturing, and new energy. Ms. Li Qing suggested introducing flipped classroom, blended learning, or virtual simulation technology to enable students to better apply vocational skills in practice. Ms. Liu Cong emphasized that teaching assessment should strengthen its linkage with industry standards by introducing enterprise evaluation criteria. The experts also suggested strengthening the integration of regional industrial cases into classroom teaching and paying more attention to students' actual skill acquisition rather than theoretical knowledge mastery.

Practical Ability

The five interviewees generally acknowledged the insufficient level of practical ability. Ms. Li Xueting attributed the lack of frontline enterprise experience (M = 3.22) as a critical issue and suggested establishing a systematic enterprise practice mechanism, arranging teachers to work in port-vicinity industry enterprises for 2–3 months each year. Ms. Li Qing recommended establishing a "double-qualified" teacher cultivation system and inviting enterprise technical experts as visiting instructors. Ms. Liu Cong suggested that practical training bases should be jointly constructed by schools and enterprises. Ms. Lao Yuanfang recommended using big data to analyze industry talent demand trends, and Ms. Li Yuting suggested introducing industry-education integration models and project-based practical training.

Research Capacity

Participants identified research capacity as the most significant bottleneck. Ms. Li Xueting emphasized that most teachers lack academic publication experience (M = 3.08) and suggested organizing academic exchanges and research workshops with mentoring systems. Ms. Li Qing recommended establishing research incentive mechanisms and interdisciplinary research teams. Ms. Liu Cong suggested strengthening research methodology courses and establishing a research achievement transformation mechanism. Ms. Lao Yuanfang promoted action research as an entry point, and Ms. Li Yuting suggested introducing AI-assisted research tools such as literature analysis software and data analysis platforms.

Innovation Capability

Participants emphasized the need for innovative thinking cultivation. Ms. Li Xueting suggested introducing design thinking-based teaching practices such as hackathons and innovation competitions. Ms. Li Qing recommended designing virtual reality-based training scenarios and gamified learning modules. Ms. Liu Cong suggested establishing a reward system for innovative teaching practices. Ms. Lao Yuanfang proposed organizing innovation-themed teaching competitions throughout the academic year, and Ms. Li Yuting recommended interdisciplinary collaboration with other departments and enterprise partners.

Professional Literacy

Participants affirmed the strong professional ethics and identity. Ms. Li Xueting suggested organizing more industry seminars to strengthen awareness of serving regional development. Ms. Li Qing recommended establishing a professional development portfolio system. Ms. Liu Cong emphasized incorporating digital ethics content into professional ethics training. Ms. Lao Yuanfang suggested integrating professional literacy development with daily teaching practice using peer recognition and student feedback, and Ms. Li Yuting recommended developing industry service projects with enterprise partners.

Digital Literacy

Participants acknowledged the moderate level with significant variability among teachers. Ms. Li Xueting suggested establishing a systematic digital literacy training system covering basic digital skills, data-driven teaching analysis, and digital resource development. Ms. Li Qing recommended building a digital teaching resource platform and a digital teaching innovation lab. Ms. Liu Cong suggested introducing data analytics training programs and AI-assisted assessment tools. Ms. Lao Yuanfang emphasized aligning digital teaching content with industry digitalization trends, and Ms. Li Yuting recommended cultivating teachers' digital innovation ability to create new digital teaching solutions.

DISCUSSION

The findings indicate that the overall level of teachers' professional competence in higher vocational colleges in Qinzhou City is at a moderate level (M = 3.40). This reflects the current situation where vocational education teacher development has received policy support but still faces practical implementation challenges. The high performance of teaching ability (M = 3.67) and professional literacy (M = 3.65) suggests that teachers have established solid pedagogical foundations and ethical awareness, which is consistent with national policy emphasis on teaching quality improvement (MOE, 2022).

The moderate levels of practical ability (M = 3.31), research capacity (M = 3.18), innovation capability (M = 3.24), and digital literacy (M = 3.36) reveal significant gaps. The low scores for frontline enterprise experience (M = 3.22) and familiarity with industry standards (M = 3.18) confirm the literature's finding that the proportion of "double-qualified" teachers remains low (Guo, 2024). The weak research capacity, particularly in academic publication (M = 3.08) and teaching material development (M = 3.05), echoes the finding that most vocational teachers lack research experience (Xu, 2023). The moderate digital literacy with significant variability (S.D. values around 0.85–0.95) is consistent with national survey data showing uneven digital competencies among vocational teachers.

These findings align with human capital theory, which emphasizes that teachers' professional competence constitutes important human capital directly determining educational quality (Sok & Heng, 2024). The results also resonate with CBE theory, which advocates for practical teaching and authentic work settings (Smith, 2020). The interview suggestions for enterprise practice, action research, and digital teaching innovation exemplify competency-based education in practice. Furthermore, the study's findings reflect the regional industrial specificity of Qinzhou, where port-vicinity industries demand technical talents with both practical skills and digital competencies, underscoring the need for localized teacher development strategies.

GUIDELINES FOR IMPROVEMENT

Optimizing Teaching Ability to Enhance Curriculum Design

Curriculum content should keep pace with port-vicinity industry development, regularly incorporating new technologies and enterprise cases from petrochemical, equipment manufacturing, and logistics industries. Interactive teaching methods such as flipped classroom,

blended learning, and virtual simulation should be introduced. Teaching evaluation should integrate process and summative assessment aligned with industry standards, with enterprise evaluation criteria introduced into the assessment system.

Strengthening Practical Ability through Industry-Education Integration

Schools should establish systematic enterprise practice mechanisms, arranging teachers to work in port-vicinity industry enterprises for 2–3 months annually. A "double-qualified" teacher cultivation system should be developed, enabling teachers to obtain industry certifications and enterprise work experience through structured programs. Joint practical training bases should be constructed by schools and enterprises, and practical training programs should be designed collaboratively to ensure alignment with industry standards. Big data can be used to analyze industry talent demand trends to help teachers adjust practical training content.

Improving Research Capacity through Academic Exchanges and Mentoring

Schools should organize regular academic exchanges and research workshops, establish mentoring systems where senior researchers guide junior teachers, and provide research funding for applied research related to port-vicinity industries. Action research should be promoted as an entry point for teachers to develop research skills through investigating their own teaching practice. AI-assisted research tools, such as literature analysis software and data analysis platforms, should be introduced. A research achievement transformation mechanism should be established to help teachers apply research findings to teaching practice.

Cultivating Innovation Capability through Interdisciplinary Collaboration

Schools should introduce innovative teaching practices based on design thinking, such as hackathons, innovation competitions, and virtual reality-based training scenarios. Interdisciplinary collaboration mechanisms should be established, developing innovation workshops with other departments and innovation training programs with enterprise partners. Innovation projects should be closely linked to port-vicinity industry needs. A reward system for innovative teaching practices should be established to incentivize teachers' innovation efforts, and innovation-themed teaching competitions should be organized throughout the academic year.

Enhancing Professional Literacy through Lifelong Learning

A professional development portfolio system should be established, requiring teachers to document learning activities and skill updates annually. Digital ethics content should be incorporated into professional ethics training, guiding teachers to critically reflect on the impact of technology on educational equity. More industry seminars and regional development forums should be organized to strengthen teachers' awareness of serving regional economic development. Professional literacy training should be practical and context-specific, addressing real challenges teachers face in daily work.

Strengthening Digital Literacy through Systematic Training

A systematic digital literacy training system should be established, covering basic digital skills, data-driven teaching analysis, and digital resource development. Training should be differentiated by skill level, with personalized learning paths for different proficiency groups. A digital teaching resource platform should be constructed, providing ready-to-use digital courseware, case libraries, and simulation tools. Data analytics training programs and AI-assisted assessment tools should be introduced. The connection with industry digitalization trends should be strengthened, and teachers' digital innovation ability should be cultivated to enable them to create new digital teaching solutions.

CONCLUSION

This study examined the level of teachers' professional competence in higher vocational colleges in Qinzhou City and proposed targeted development guidelines. The findings indicate that the

overall level is moderate (M = 3.40, S.D. = 0.87), with teaching ability (M = 3.67) and professional literacy (M = 3.65) at a high level, while practical ability (M = 3.31), research capacity (M = 3.18), innovation capability (M = 3.24), and digital literacy (M = 3.36) at a moderate level. The results suggest that while teachers have established solid pedagogical and ethical foundations, significant gaps remain in industry integration, research engagement, innovation, and digital competencies.

The interview findings revealed that teachers lack frontline enterprise experience, academic publication skills, and data-driven digital competencies. The proposed guidelines — focusing on enterprise practice mechanisms, research mentoring systems, teaching innovation through interdisciplinary collaboration, lifelong learning awareness, and systematic digital training — provide practical implications for enhancing teachers' professional competence. These findings offer valuable references for higher vocational colleges seeking to strengthen teacher development in the context of educational digitalization and regional industrial upgrading, ultimately supporting the high-quality development of vocational education in Qinzhou City.

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Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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