

PROCEEDINGS ARTICLE

Current Status, Challenges, and Breakthrough Paths in the Construction of Dual-Qualified Teacher Teams in Guangdong Private Higher Vocational Colleges Driven by the Digital Economy

Yazhi Zhang^{1,*} and Jing Wang²

¹Huizhou Economics And Polytechnic College, Huizhou, 516057, China;

²City College Of Huizhou, Huizhou, 516025, China; 114139974@qq.com

*Corresponding author. Email: 469301869@qq.com

Abstract

In the digital era, there is an urgent need for interdisciplinary, high-quality technical and skilled talents. The cultivation of such high-caliber professionals relies on high-level "dual-qualified" teachers. Based on a survey and analysis of 12 private higher education institutions participating in the "Innovation-Driven School Development Project," this study utilizes digital technologies to reconstruct effective pathways and supporting measures for building dual-qualified teacher teams in Guangdong's private higher vocational colleges. This reconstruction is conducted across seven dimensions: organizational structure, cultivation mechanisms, talent recruitment, competitive systems, performance evaluation, incentive strategies, and resource safeguards.

Keywords: Digital Economy; Private Vocational Colleges; "Double-qualified" Teacher

1. FOREWORD

As the digital economy has become the core engine of global economic growth, it is reconstructing the education ecology, supported by big data, artificial intelligence, blockchain and other technologies. Vocational education, as the main position of skilled personnel training in the era of digital economy, is urgent to realize connotative development through the digital transformation of teachers. The construction of "double-qualified" teachers is crucial to improving the quality of vocational education and enhancing the ability of vocational colleges to serve regional economic and social development, and is the key starting point of vocational education reform. Based on this, the further study of digital economy era of Guangdong private vocational colleges "double" teachers team construction difficulties and path breakthrough, not only for Guangdong private vocational colleges provide operational reform Suggestions, help its accurate docking "a large bay area of Guangdong" digital economy industry cluster talent demand, also can provide reference for the national vocational education high quality development and reference.

2. REVIEW OF DOMESTIC AND FOREIGN RESEARCH STATUS, TOPIC SELECTION BACKGROUND AND SIGNIFICANCE

2.1. Review of Domestic and Foreign Research Status

2.1.1. Research on Digital Transformation at Home and Abroad

Digital transformation is an important measure and an effective way to promote the high-quality development of the Chinese economy. In order to fully understand the research and progress of digital transformation at home and abroad, take the theme of digital transformation included in the China

National Knowledge Network (CNKI) database from 2000 to 2024 as the research object, and the scientific knowledge graph software CiteSpace is used to sort out the research process of digital transformation in China, and conduct visual analysis as shown. It is found that the research of digital transformation in China is increasing rapidly; the cooperation between authors and research institutions needs to be strengthened; the research focus mainly includes digital publishing, enterprise management, industrial Internet, manufacturing, newspaper, publishing and so on. After experiencing the road of digital transformation from traditional industry to modern industry, China's digital transformation has entered a period of great development. According to the literature data search, the research on digital transformation by domestic scholars was first published in 2000¹, which opened the door to the research on digital transformation in China. As can be seen from the number of articles posted on digital transformation, it is closely related to the guidance of digital transformation policies, the rapid development of digital technology and the promotion of specific application in China in the past decade.

From the perspective of the definition of the concept of enterprise digital transformation, Li Hui and Liang Dandan believe that the essence of digital transformation is the transformation of enterprises by digital technology, which makes enterprises more intelligent and digital in the face of uncertainty, and improves the production efficiency of enterprises². Zhang Pei and Zhang Miaomiao emphasize the horizontal and vertical role of technology in promoting the digital transformation of enterprises, and divide the digital transformation of enterprises into four types: leverage, parallel drive, internal drive, and powerless type³.

Foreign research on digital transformation started earlier, and the earliest mentioned concepts of digital transformation were McCarthy M and Patel K (Patel and McCarthy, 2000), but they did not conceptualize this term. Throughout foreign studies, few scholars have made an accurate, strict definition and in-depth analysis of the concept of digital transformation. At present, the generally accepted definition of digital transformation in the academic community means that it redefines entrepreneurial thinking, business model, innovation mechanism, management mode, etc., which is not only the back-end operation of Internet technology, but also has a profound impact on the whole organization. For the factors affecting digital transformation, most scholars believe that it is mainly customers, organizations and technologies. In view of the digital transformation at the technical level, Marc K. Peter etcetera. mentioned that the rapid development and application of big data, cloud computing, blockchain and artificial intelligence provide technical support for the digital transformation of enterprises⁴.

2.1.2. Research on "Double-Qualified" Teachers at Home and Abroad

There is abundant research on "double-qualified"; teachers at home and abroad. After consulting a large number of research data, the research mainly focuses on the concept of "double-qualified"; teachers and the path of "double-qualified" teacher team construction. The research process is generally gradually expanded from the concept standard to the quality and construction path. In addition, there are some comparative studies on the training of training courses, legal systems, evaluation mechanisms and other safeguards.

At present, domestic scholars have carried out a lot of research on the construction of "double-qualified" teachers, and made several discussions on the connotation, system, training, standards and other aspects. The more comprehensive studies are Linwei Tang and Mingxing Zhou in the Review of Research on "Double-qualified" Teachers in Vocational Colleges, The research comprehensively interprets the concept development process of "double-qualified" teachers, Point out that: Conceptually, There are "double certificate", "double ability (double quality)", "superposition", "double title", "double level", "specific" said; From the standards said, Administrative standards, college standards and academic standards; In terms of the culture mode, There are college training mode, enterprise grafting mode, school-based training mode and self-generation mode; In terms of management, There are three levels: individual, school and country; In terms of the development trends, There are "three division type" and "four division type" said. In terms of development pathways, international vocational teacher training systems demonstrate three core components: professional standards, qualification certifications, and curriculum design. These systems are characterized by broad - based professional standards, tiered qualification frameworks, and spiral curriculum structures⁵. In the

"double" teacher team construction path and training mode, higher vocational education needs a know the teaching rules, and has rich practical experience of "double" teachers, teacher construction should take the policy of combination, to strengthen the construction of teachers' theory and professional skills training, establish efficient professional development system, at the same time from production, practice into the classroom.

Internationally, there is no equivalent term for "dual - qualified teachers" as used in China. Instead, various countries have developed context - specific terminology reflecting similar concepts tailored to their vocational education systems. Notable examples include Germany's "dual - system vocational educators," the UK's "integrated teachers," and Japan's "vocational training instructors." Although differing in terminology, these frameworks all impose rigorous standards for pre - service, in - service, and post - service teacher professional knowledge, practical competencies, and teaching capabilities.

2.1.3. Study Review

At present, the domestic academic circles have rich research on the construction of "double-qualified" teachers, especially the research results in the quality of "double-qualified" teachers are relatively mature. However, there are also some shortcomings: first of all, the research on the connotation of "double-qualified" teachers has not formed an authoritative and unified statement, which is not conducive to the certification and management of "double-qualified" teacher qualifications. Secondly, most of the current studies on the problems existing in the construction of "double-qualified" teachers adopt the method of qualitative research, and adopt relatively few quantitative research literature, which leads to the insufficient proposed countermeasures. Finally, most of the current research on "double-qualified" teacher training focuses on practical ability, teaching level, professional theory, and there is less research on the legal guarantee, ideological and moral construction and educational function of the construction of "double-qualified" teachers. In particular, there are fewer studies on private vocational education institutions. Some foreign vocational education countries have formed a unified and authoritative certification system and a systematic teacher professional development system, but there are few problems and countermeasures on the construction of teachers in foreign vocational education colleges. This makes the direct connection between private vocational colleges low when drawing on the experience of foreign vocational education teachers. Therefore, it is urgent to build a team of "double-qualified" teachers who are in line with the actual situation of Guangdong Province, the characteristics of private higher vocational colleges and the requirements of digital transformation.

2.2. Background and Significance of the Topic Selection

2.2.1. Background

The party's 20th report clearly puts forward "promoting the digitalization of education", and the construction of education digitalization has increasingly become the focus of education reform and development. General Secretary Jinping Xi has pointed out that in the new journey of building a modern socialist country in an all-round way, vocational education has a broad future and great potential, and we must take the building of teachers as the basic work. The 14th Five-Year Plan for Education Development in Guangdong Province proposes that "the quality of teachers should be steadily improved and take the lead in establishing a high-quality development model of vocational education with Chinese characteristics. By 2025, the proportion of "double-qualified" teachers in vocational education should reach 65% of teachers in professional courses. However, there are some problems in the private higher vocational colleges in Guangdong province, such as the insufficient number of professional teachers, the unreasonable structure, and a small proportion of "double-qualified" teachers. Therefore, under the background of digital transformation, it is urgent to analyze the problems existing in the construction of "double-qualified" teachers in Guangdong private vocational colleges, and to build a group of high-quality, professional and innovative "double-qualified" teachers.

2.2.2. Significance of the Topic Selection

Because the private higher vocational colleges teachers in status, treatment and security

mechanism and public higher vocational colleges, combined with the private vocational colleges focus on enterprise performance management mode, the development of teachers to grow the cost is not high, personnel liquidity is bigger, private higher vocational colleges "double-qualified" teachers team construction process is long. In the case of 1000,1000 in the Institute. With digital transformation as the research background, build with the characteristics of Guangdong private vocational colleges "double-qualified" teachers team construction path, help to enrich and perfect Guangdong higher vocational colleges "double-qualified" teachers team construction system theory, further understanding "double" teachers team construction, digital can improve Guangdong private vocational colleges "double-qualified" teachers team construction quality.

3. SURVEY AND ANALYSIS OF THE CURRENT STATUS OF THE CONSTRUCTION OF DUAL-QUALIFIED TEACHER TEAMS IN GUANGDONG PRIVATE HIGHER VOCATIONAL COLLEGES

3.1. Study Design

In order to better understand the Guangdong private vocational colleges "double type" the basic situation of teachers team construction, the survey selected 2024 higher vocational education "innovation school project" in 12 teachers of private vocational colleges as the survey object, the combination of quantitative research and qualitative research, and give priority to with questionnaire survey, interview survey, text analysis complementary way.

Table 1. Basic situation of 12 private higher vocational colleges in Guangdong Province

Serial Number	School Name	Location City	Planning Category	Assessment Score	Ranking	Region
1	Guangzhou Urban Construction College	Guangzhou	Category A	78.25	27	Pearl River Delta
2	Guangzhou Nanyang Polytechnic College	Guangzhou	Category A	76.32	33	Pearl River Delta
3	Guangzhou Huali Science and Technology Vocational College	Guangzhou	Category B	82.09	43	Pearl River Delta
4	Guangdong Xin'an Polytechnic College	Shenzhen	Category B	78.22	46	Pearl River Delta
5	Guangdong Country Garden Polytechnic College	Qingyuan	Category B	74.86	52	Northern Guangdong
6	Guangdong Nanfang Polytechnic College	Jiangmen	Category B	72.69	53	Pearl River Delta
7	Guangzhou International Economics College	Guangzhou	Category B	64.46	63	Pearl River Delta
8	Guangdong Wenli Vocational College	Zhanjiang	Category B	64.34	64	Western Guangdong
9	Zhuhai Art College	Zhuhai	Category B	63.02	67	Pearl River Delta
10	Huizhou Economics and Polytechnic College	Huizhou	Category B	60.95	69	Pearl River

11	Guangdong Innovative Technology College	Dongguan	Category C	76.98	79	Delta Pearl River Delta
12	Chaoshan Polytechnic College	Jieyang	Category C	68.11	87	Eastern Guangdong

3.1.1. Design of the Questionnaire

The questionnaire has designed 33 questions around the development of "double-qualified" teachers in private higher vocational colleges under the background of digital transformation. The questionnaire is divided into seven dimensions, namely: basic information, digital literacy level, training, identification standards, evaluation and employment of professional titles, incentive and introduction.

3.1.2. Compilation of the Interview Outline

Considering that some questions were difficult to show in the form of questionnaires, or could not be answered in more detail, in order to have a more thorough understanding of the research questions, this study used the interview method to interview 11 "double-qualified" teachers in HJ College. The interview mainly includes five dimensions, namely, the connotation and identification standards of double-qualified teachers, the training of double-qualified teachers, the incentive policy of double-qualified teachers, the title evaluation and employment of double-qualified teachers and the loss of teachers.

3.1.3. Data Collection

The research group uses the questionnaire star to edit and distribute the questionnaire online. The 12 private colleges and universities in Guangdong Province have been recognized as "double-qualified" teachers or have the opportunity to be recognized as "double-qualified" teachers in the future, and distributed and collected the questionnaire mainly through the online filling and answer method. By the end of November 2024, a total of 250 questionnaires had been collected, and invalid questionnaires were removed, and 230 valid questionnaires were collected, with an effective recovery rate of 92%. The recovered data were entered and statistical analysis using the statistical software SPSS20.0. Through one-dimensional frequency analysis of single choice and multiple choice, the specific distribution of survey data can be obtained.

3.2. Analysis of the Survey Results

3.2.1. Basic Information of the "Double-Qualified" Teachers

The one-dimensional frequency analysis of the basic information of "double-qualified" teachers can grasp the structural characteristics of the number, gender structure, age structure and teaching age structure in the current teaching team.

3.2.1.1. Number of "Double-Qualified" Teachers

In the survey of the number of "double-qualified" teachers, there were 200 "double-qualified" teachers, accounting for 86.96%, and 30 non- "double-qualified" teachers, accounting for 13.04%. It can be seen that private higher vocational colleges attach more attention to the construction of "double-qualified" teachers.

3.2.1.2. Gender Structure

Among the total teachers surveyed, 110 are male teachers, accounting for 47.83%, and 120 are female teachers, accounting for 52.17%. The number of male teachers is slightly lower than female teachers, but the gap is not large.

3.2.1.3. Age Structure

In terms of age structure, teachers aged 41-50 are the most, a total of 100, accounting for 43.48%, followed by teachers aged 36-40, a total of 60, accounting for 26.09%, followed by teachers aged 51-60, a total of 60, accounting for 26.09%, and finally teachers under 35, only 10, accounting for 3.34%. It can be seen that the "double-qualified" teachers are generally middle-aged. Most of the teachers are between 40 and 50 years old, and the number of older teachers is large.

Table 2. Basic situation of teachers in 12 private higher vocational colleges in Guangdong Province in 2023

Serial Number	School Name	Proportion of Dual-qualified Teachers among Professional Course Teachers (%)	Proportion of Teachers with Senior Titles (%)	Student-teacher Ratio	Number of Industry Tutors Hired (persons)	Annual Amount of Special Financial Appropriation (ten thousand yuan)
1	Guangzhou Urban Construction College	80.04%	22.13%	17.53	564	876.33
2	Guangzhou Nanyang Polytechnic College	74.47%	26.06%	16.76	29	3580.86
3	Guangzhou Huali Science and Technology Vocational College	69.60%	20.11%	20.08	187	2490.33
4	Guangdong Xin'an Polytechnic College	54.61%	22.88%	22.44	106	0
5	Guangdong Country Garden Polytechnic College	38.21%	23.17%	10.73	54	741.24
6	Guangdong Nanfang Polytechnic College	60.07%	26.86%	17.72	405	23
7	Guangzhou International Economics College	39.84%	20.12%	23.77	83	0
8	Guangdong Wenli Vocational College	51.30%	33.62%	17.75	10	0
9	Zhuhai Art College	35.78%	20.53%	14.92	58	449.98
10	Huizhou Economics and Polytechnic College	44.14%	20.00%	20.49	87	1711.00
11	Guangdong Innovative Technology College	43.12%	20.37%	14.13	302	2697.88
12	Chaoshan Polytechnic College	39.30%	12.84%	22.34	11	1564.32
Average Value		52.54%	22.29%	18.22	158	1177.91

3.2.1.4. Teaching Age Structure

In the teaching age structure, the number of people with education over 15 years is the largest, with 120 people, accounting for 52.17%, followed by the number of people with education over 11 to 15 years, accounting for 80 people, accounting for 34.78%, and under 10 years, 30 people, accounting for 13.05%. This shows that in order to meet the requirements of "double-qualified" teachers, the accumulation of teaching working years is needed.

3.2.2. The Digital Literacy Level of "Double-Qualified" Teachers

The rapid development of digital economy has promoted the digital transformation of vocational education, which puts forward new requirements for the "double-qualified" digital teaching ability of private higher vocational colleges. Digital teaching ability refers to teacher's awareness,

accomplishment, ability and research to integrate digital technology into teaching. According to the questionnaire survey of "double-qualified" teachers, only 30 people can widely use digital technology tools in teaching, accounting for 13.04%; 100 people often use digital technology tools in teaching, accounting for 43.48%. This shows that "double-qualified teachers have a strong awareness of actively integrating digital technology into teaching. According to the questionnaire survey of whether double-qualified teachers have enough time and energy to participate in the development and construction of digital teaching resources, 20 people have almost no time and energy, accounting for 8.69%, 120 people have some nervous time and energy, accounting for 52.17%, 80 people are very intense time and energy, accounting for 34.78%, and 10 people have enough time and energy, accounting for 4.36%. This shows that due to the limitation of time and energy, teachers' ability to actively use digital technology to carry out teaching and research needs to be improved. According to the digital economy era "double" teachers need to improve the ability of the questionnaire survey, the first is the digital teaching design, implementation and evaluation ability, accounted for 86.96%, the second is the digital resources development, integration and application ability, accounted for 78.26%, ranked third is digital communication, communication and collaboration ability, accounted for 69.57%. This shows that improving the digital teaching ability of double-qualified teachers is the core content of the digital transformation of vocational education.

3.2.3. Training of "Double-Qualified" Teachers

According to the survey of whether the "double-qualified" teachers have participated in the training of digital technology skills, only 20 people, accounting for 8.69%, have participated in the digital technology training for many times. Therefore, private higher vocational colleges in Guangdong Province should increase the training in the application of "double-qualified teachers, and provide them with needed training according to their title, gender, type, so as to better promote "double-qualified" teachers to master digital technology tools and apply them to the actual teaching work.

3.2.4. Identification Standards for "Double-Qualified" Teachers

According to the questionnaire survey on whether the identification criteria of "double-qualified" teachers are clear, 60 are very clear, accounting for 26.09%, 120 are clear, accounting for 52.17%, 30 are clear, accounting for 13.04%, and 20 are not clear, accounting for 8.7%. This shows that most teachers have a clear understanding of the standards and basic conditions of "double-qualified" teachers. "double-qualified" teachers need to have good ideological and political quality and ethics, solid teaching ability and enterprise practice ability, be familiar with the industry situation, and be able to integrate new technologies and new processes into teaching. Different levels (primary, middle, high) have different specific requirements, different provinces and different regions have specific rules, but they are not lower than the national standards.

3.2.5. Professional Title Evaluation And Employment Of "Double-Qualified" Teachers

Through the "double type" teachers in higher vocational colleges in Guangdong province in the title evaluation have separate evaluation channel or standard questionnaire survey, no difference, and other teachers have 120 people, 52.17%, have some difference between 40 people, accounting for 17.39%, have completely independent 30 people, 13.04%, which suggests that most higher vocational colleges are not in the title evaluation of "double-qualified" teachers policy, this is not conducive to improve private higher vocational colleges teachers to participate in the "double-qualified" teachers that initiative.

3.2.6. Incentive Policies for "Double-Qualified" Teachers

Through the private vocational colleges in Guangdong province to "double" teachers incentive policy questionnaire survey, the school of "double" teachers incentive policy generally 110 people, 47.83%, the poor 30 people, accounted for 13.04%, better 60 people, 26.09%, very good 30 people, accounted for 13.04%, this shows that most of the private higher vocational colleges to "double" teachers incentive policy needs to be improved.

3.2.7. Introduction of "Double-Qualified" Teachers

Through the private vocational colleges in Guangdong province in the introduction of "double" teachers may face difficult questionnaire survey, in the first is less attractive, accounted for 95.65%, in the second is the talent recruitment competition, accounted for 65.22%, the third is recruitment channels is limited, into the school culture difficulties, accounted for 43.48%. This shows that compared with public colleges, and it is difficult to introduce excellent high-level "double-qualified" teachers.

4. CONCLUSION AND POLICY RECOMMENDATIONS

Against the backdrop of rapid evolution in the digital economy industry, private higher vocational colleges in Guangdong face multiple challenges in their dual-qualified teacher teams: Imbalances in the quantity and structure of dual-qualified teachers; Urgent need to improve teachers' digital literacy; Insufficient financial investment and formalistic school-enterprise cooperation; Inadequate policy support and incentive mechanisms. These challenges lead to a mismatch between the digital competency supply of dual-qualified teachers and the demands of the digital economy industry, constraining the high-quality development of regional vocational education. To address this, the following measures are proposed.

Funding Support: This research is a phased outcome of the 2023 Higher Education Special Project under the Guangdong Provincial Education Science Planning, titled "Research on the Dilemmas and Paths of Constructing Dual-Qualified Teacher Teams in Guangdong Private Higher Vocational Colleges under the Background of Digital Transformation" (Project No.: 2023GXJK1049).

REFERENCE

1. Geng, X.Q. How Kodak Company responds to digital transformation. *Photosensitive Materials*, **2000**, 4(04): 59-62.
2. Li, H.; Liang, D.D. Mechanism, Path and Countermeasures of Enterprise digital transformation. *Guizhou Social Sciences*, **2020**, 10(10): 120-125.
3. Zhang, P.; Zhang, M.M. Types and trigger mechanisms of digital transformation in Manufacturing Enterprises. *Management Modernization*, **2020**, 40(06): 19-24.
4. Peter, M.K.; Kraft, C.; Lindeque, J. Strategic action fields of digital transformation. *Journal of Strategy and Management*, **2020**, 13(1): 160-180.
5. Zeng, Q.S.; Liu, Q. The connotation, characteristics and ability model of "craftsman" teachers in vocational colleges. *China Vocational and Technical Education*, **2021**, 25(25): 92-96.
6. Ren, Y.Q. Optimize the Type Positioning of Vocational Education and Build a High-quality Vocational Education Teacher Team. *Chinese Vocational and Technical Education*, **2023**, 5(5): 5-11.
7. Cao, Y.; Meng, Q.G. Promote the Integration of Industry and Education in Vocational Education and the Construction of a High-quality "Double-qualified" Vocational Teacher Team. *Chinese Vocational and Technical Education*, **2023**, 3(3): 19-24.
8. Wang, S.; Li, D.X. Exploration and Practice on the Construction of High-quality "Double-qualified" Vocational Teacher Teams. *Journal of Heilongjiang Administrative Cadre College of Politics and Law*, **2024**, 6(6): 153-156.