Construction of the Evaluation Index System for the Teaching Competence of 'Double-Qualified' Teachers in New Era Higher Vocational Colleges

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Abstract. In response to the practical demands of building a "Double-Qualified" teacher workforce in new era higher vocational colleges, this study, based on an analysis of their teaching characteristics, proposes a systematic approach to construct a scientifically sound evaluation index system for teaching competence. By establishing principles for selecting indicators, a framework with 3 primary indicators and 11 secondary indicators is designed, with corresponding weights assigned to each indicator through expert rating. Subsequent empirical testing validates the reliability and validity of this evaluation system. The research shows that the constructed index system comprehensively reflects the teaching competence of "Double-Qualified" teachers and provides an effective tool for strengthening the construction of such teacher teams. However, with further practical implementation, the evaluation system will require continuous optimization and refinement.

Keywords: Higher vocational education; Double-Qualified teachers; Teaching competence; Evaluation indicators

1 Introduction

China's rapid economic and social development has created an urgent demand for a large number of high-quality skilled talents [1]. As the main supplier of skilled talents, higher vocational colleges have the historical mission of closely aligning talent cultivation with economic and social development. In this context, higher vocational colleges have seized the important opportunity to implement the construction of a "Double-Qualified" teacher workforce, vigorously nurturing teachers who possess both a strong theoretical foundation and rich practical experience. How to accurately evaluate and effectively enhance the teaching competence of this "Double-Qualified" teacher workforce has become a critical issue that needs to be addressed urgently. The construction of a scientifically sound evaluation index system for teaching competence is of significant guiding importance for advancing the construction of the "Double-Qualified" teacher workforce, implementing the fundamental task of fostering morality and cultivating talents.

EIMT 2024, March 29-31, Wuhan, People's Republic of China

DOI 10.4108/eai.29-3-2024.2347650

2 Analysis of the teaching characteristics of "double-qualified" teachers in new era higher vocational colleges

2.1 Definition of "double-qualified" teachers in new era higher vocational colleges

"Double-Qualified" teachers in new era higher vocational colleges refer to teaching professionals with dual backgrounds - they possess theoretical knowledge in education like pedagogy and psychology, as well as practical industry experience[2]. They need to understand vocational education laws, have teaching competencies like curriculum design and diverse strategies. They also must accumulate relevant work experience, be familiar with industry developments, and understand changing job requirements. Only with practical experience can teachers make teaching content reflective of real workplace practices. "Double-Qualified" teachers seamlessly integrate educational and industry competence to cultivate versatile, applied talents through specialized teaching[3].

2.2 Teaching characteristics of "double-qualified" teachers in new era higher vocational colleges

The most prominent feature of the teaching by "Double-Qualified" teachers in new era higher vocational colleges is the integration of theory and practice. These teachers not only possess a solid foundation in professional theoretical knowledge but also have rich industry practical experience. They can skillfully combine abstract theoretical knowledge with practical work requirements, making the teaching content more closely aligned with industry development trends and job demands, as shown in Figure 1 [4].

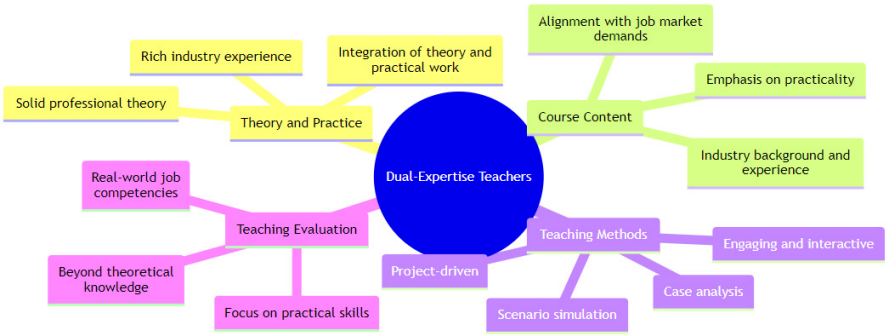

Figure 1. Teaching characteristics of "Double-qualified" Teachers in new era higher vocational colleges

In terms of curriculum, "Double-Qualified" teachers emphasize practicality - they leverage industry background to design practical courses and modules aligned with latest job requirements and skills[5]. Their flexible, diverse teaching methods like case analysis, project-driven learning, and situational simulations not only convey knowledge but greatly enhance student engagement and motivation. Regarding assessments, they focus on competency-based evaluations that test practical vocational skills and employability, rather than just theoretical knowledge. This aligns teaching outcomes with the goal of developing versatile, applied talents[6].

3 Construction of the evaluation index system for teaching competence of "double-qualified" teachers

3.1 Principles for index selection

Constructing an evaluation index system for the teaching competence of "Double-Qualified" teachers should follow three fundamental principles: comprehensiveness, representativeness, and feasibility [7]. It should create a multidimensional index system that encompasses all aspects of teaching design, execution, and feedback on teaching effectiveness, while considering both theoretical and practical teaching dimensions. Moreover, it should precisely target the distinctive characteristics of "Double-Qualified" teachers by selecting the most typical indicators that highlight the organic integration of their theoretical knowledge and practical experience. Each selected indicator must have a clear definition, be subject to objective quantitative or qualitative measurement, and provide clear and intuitive evaluation results to establish a data foundation for subsequent applications [8]. Only in this way can the constructed evaluation index framework comprehensively and scientifically capture the true essence of the teaching competence of "Double-Qualified" teachers.

3.2 Model for determining indicator weights

The rational determination of indicator weights is crucial in constructing the evaluation index system for teaching competence. To comprehensively and objectively determine the weights of each indicator in the evaluation of the teaching competence of "Double-Qualified" teachers, the expert rating method can be employed.

$$W_i = \frac{S_i}{S_{total}} \tag{1}$$

Where W_i represents the weight of the i-th indicator, S_i is the total score of the i-th indicator, and S_{total} is the total score of all indicators.The specific approach involves inviting ten experts and scholars in the field to rate the importance of each evaluation indicator using a quantified method ranging from 1 to 9, based on predefined rating criteria. Subsequently, collect all expert ratings and calculate the weight of each indicator: by dividing the total score of the indicator by the total score of all indicators, the weight value of the indicator is obtained. Arrange the indicators in descending order of weight values to ultimately determine the structure of the indicator system and weight allocation. This collective result of rating by multiple experts with knowledge and practical experience ensures a more comprehensive and accurate judgment of indicator weights and provides a scientific basis for subsequent evaluation work [9].

3.3 Design of the indicator system

The design of the indicator system is the core component of evaluating the teaching competence of "Double-Qualified" teachers. Following the principles of indicator selection mentioned earlier, this study has constructed a three-tiered indicator system that not only maintains the coherence of the teaching process but also highlights the characteristics of "Double-Qualified" teachers, as shown in Figure 2.

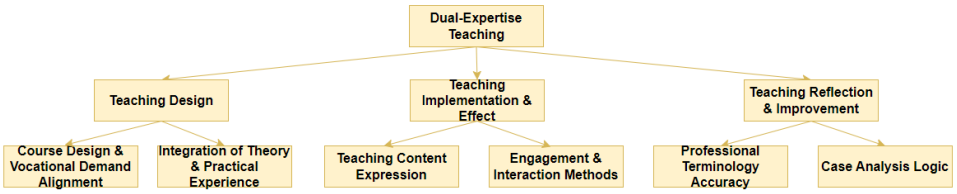

Figure 2. Indicator system design

The first-tier level includes teaching design, implementation, and reflection for holistic evaluation. Second-tier quantifiable indicators like integrating theory and practice ability or curriculum-vocational alignment specifically leverage "Double-Qualified" teachers' strengths[10]. Third-tier indicators under these further facilitate multidimensional assessment - for example, accuracy in using terminology and logical case analysis under teaching content expression. Throughout setting indicators, researchers combined in-depth research with scientific design for maximal scientific, systematic and operational nature. This theoretical yet practical approach aims to enable fair competence assessment for "Double-Qualified" teachers.

4.Indicator system validation

4.1 Empirical research methodology

To comprehensively validate the scientific and practical nature of the constructed evaluation index system for the teaching competence of "Double-Qualified" teachers, this study employed a questionnaire survey method supplemented by quantitative analysis.

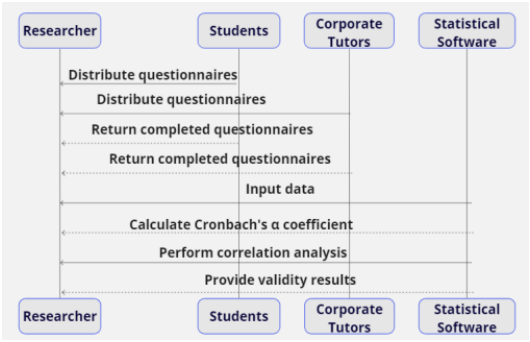

Figure 3. Empirical research methodology

As shown in Figure 3, a questionnaire based on the indicator system with quantitative questions was distributed to 100 higher vocational college students and 10 industry mentors for assessment. Upon collecting 95 valid responses, statistical software examined the reliability via Cronbach's α, testing the scientific question formulation, and construct validity via correlation analysis between indicators and overall evaluation. This combined qualitative survey and quantitative analysis fully validates the practicality and applicability of the constructed evaluation system.

4.2 Empirical results

The empirical results validate the questionnaire's scientific validity. The Cronbach's α coefficient surpasses 0.8, indicating inherent consistency in the questions that accurately capture assessed subjects' characteristics. This suggests the constructed evaluation system for "Double-Qualified" teachers' competence is scientifically rigorous in structural design and logical relationships. The questionnaire can effectively measure teaching competence levels. Correlation analysis shows high coefficients between key primary indicators like teaching design, process control and reflection competencies with overall evaluation (0.81-0.83), suggesting these indicators comprehensively reflect and are core in assessing teaching competence,as shown in Table 1.

Table 1. Correlation Coefficients among Different Primary Indicators

Primary Indicators	Teaching Design Competence	Teaching Process Control Competence	Teaching Reflection Competence
Teaching Design Competence	1.00	0.81	0.79
Teaching Process Control Competence	0.81	1.00	0.83
Teaching Reflection Competence	0.79	0.83	1.00

Some secondary indicators, such as "ability to apply professional theory," also achieved a correlation coefficient of 0.76, indicating a high level of consistency with the overall evaluation. This suggests that the indicator system is effective in capturing key factors in teaching competence at the secondary indicator level, as shown in Figure 4.

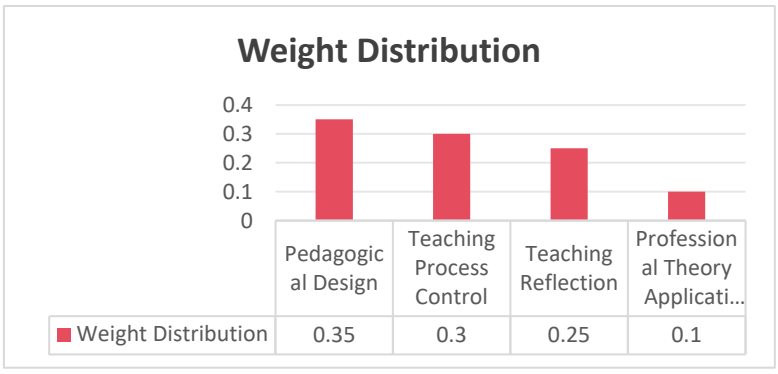

Figure 4. Weight distribution of different primary or secondary indicators in the overall evaluation

Overall, the results of the correlation analysis demonstrate that the constructed indicator system can comprehensively and scientifically reflect a teacher's teaching competence, whether at a macro or micro level. The judgment results align closely with the overall evaluation.

4.3 Effectiveness assessment

The empirical research validates the evaluation system's strong scientific validity and practicality for assessing "Double-Qualified" teachers' competence. The logically designed hierarchical indicators and the questionnaire with high internal consistency confirm the rationale. Correlations between key indicators and overall evaluation suggest effectiveness in reflecting specifics for accurate formative and summative assessment, integrating process monitoring and outcome judgment. This multi-dimensional, user-friendly system focuses on cultivating aligned competencies per higher vocational education requirements. By enabling quantitative assessment to guide and standardize teaching, it can improve quality. Overall, this scientifically rigorous and practical system serves as a powerful tool to advance "Double-Qualified" teacher team building.

5 Conclusion

Based on an analysis of the teaching characteristics of "Double-Qualified" teachers in new era higher vocational colleges and following scientifically sound principles for indicator selection, this study has constructed an evaluation index system for teaching competence consisting of three primary indicators and eleven secondary indicators. This index system comprehensively considers both theoretical and practical teaching aspects and selects important evaluation dimensions that effectively reflect the characteristics of "Double-Qualified" teachers. The weights of each evaluation indicator were determined through authoritative expert rating. In the subsequent empirical validation, the index system demonstrated good reliability and validity. Although the sample size is limited, and the scope of evaluation can be expanded, this research provides valuable references for optimizing and enhancing the evaluation index system for the teaching competence of "Double-Qualified" teachers.

Acknowledgments. 1.Liaoning Provincial Education Science“14th Five-Year Plan”Project, Research on Evaluation System of Teaching Ability of “dual-teacher model” in Higher Vocational Colleges and Universities（JG22EB053）; 2. Research Project of Liaoning Modern Distance Education Society“Digital Teaching Reform of Construction Materials Course in Open Vocational Education”in 2023 (2023XH-12);3. 2023 Project of the Steering Committee of Informatization Teaching in Vocational Colleges and Universities of the Ministry of Education, "Reform and Practice of Digital Teaching in Higher Vocational Construction Materials Courses Based on Multiple Student Sources" (KT22010).

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