Professional Learning Communities Model for Higher Vocational Colleges in Shaanxi Province

Xiaoqing Liu[1], Thada Siththada[2], and Suttipong Boonphadung[3]

[1]Graduate School, Suan Sunandha Rajabhat University
China, School of Mechanical Engineering, Shaanxi Institute of Technology
[2,3]Department of Educational Administration,
Graduate School, Suan Sunandha Rajabhat University
Email: lxq94202239@gmail.com[1], thada.si@ssru.ac.th[2], Suttipong.bo@ssru.ac.th[3]

Abstract

The objectives of this research were to 1) investigate the current level of professional learning communities (PLC) among teachers in higher vocational colleges in Shaanxi Province, 2) identify and validate the core dimensions of PLC through empirical and qualitative analysis, and 3) develop a comprehensive PLC model suitable for vocational education institutions. The sample consisted of 606 teachers from representative vocational colleges, and nine administrative leaders were selected for in-depth interviews. The research instruments included structured questionnaires and semi-structured interviews. A mixed-methods approach was employed, combining confirmatory factor analysis (CFA) to test the measurement model and thematic content analysis to interpret the qualitative interview data. The findings revealed that Shared Goals and Vision, Teacher Motivation, and Industry-Education Integration exerted the strongest influence on PLC engagement. The PLC model comprises eight critical dimensions: 1) Leadership Support, 2) School Support, 3) Shared Goals and Vision, 4) Collaborative Culture, 5) Teacher Motivation, 6) Teacher Cognition, 7) Industry-Education Integration, and 8) Professional Development Opportunities.

Keywords: PLC Development, PLC Model, Chinese Higher Vocational Colleges

Introduction

In recent years, the professional development of teachers has become a central focus in global education reform, particularly in vocational education systems undergoing rapid transformation. PLC have emerged as a promising model for enhancing teacher collaboration, instructional improvement, and organisational learning (DuFour et al., 2020). As structured networks of educators engaging in reflective inquiry, PLC provide a platform for continuous professional development and shared pedagogical innovation. Within the context of Chinese higher vocational education, the implementation of PLC is particularly vital. These institutions bear the dual responsibility of aligning educational practices with evolving industry standards and cultivating high-quality technical talent (Cheng & Zhao, 2023). However, challenges such as teacher isolation, limited interdepartmental collaboration, and fragmented professional development pathways continue to hinder the effective development of PLC in China's

vocational colleges (Liu Hao & Zhang Wenzhong, 2023). In Shaanxi Province—one of China's key regions for vocational education—these issues are further compounded by uneven institutional capacity and varying levels of policy support, making the advancement of PLC both a necessity and a strategic opportunity.

Existing literature highlights the benefits of PLC in improving teacher efficacy, job satisfaction, and student achievement (Ciampa & Gallagher, 2016), yet most studies remain focused on general education settings or basic education levels. Empirical investigations of PLC tailored to the structure, function, and demands of Chinese higher vocational colleges are scarce. Furthermore, limited research has examined PLC from a multidimensional perspective that incorporates leadership, institutional culture, teacher motivation, and industry-education integration in a coherent framework (Bedoya et al., 2023).

To address these gaps, this study focuses on developing a PLC model for higher vocational colleges in Shaanxi Province based on eight critical dimensions identified through literature review and empirical validation. These include leadership support, school support, shared goals and vision, collaborative culture, teacher motivation, teacher cognition, industry-education integration, and professional development opportunities. By constructing and validating a contextualized PLC model through rigorous statistical analysis, this research seeks to contribute to both theoretical advancement and practical reform in the field of vocational teacher development.

Research Objectives

The objectives of this research are as follows:

1.To stud the level of professional learning communities of higher vocational colleges in shaanxi province

2.To study confirmatory factor analysis of professional learning communities of higher vocational colleges in shaanxi province

3.To propose the development of professional learning communities model of higher vocational colleges in shaanxi province.

Scope of the Research

1. Population Scope

This research focuses on teachers working in higher vocational colleges in Shaanxi Province, China. The study includes teaching administrators, department heads, core faculty members, and general instructors from a total of 43 institutions. A total of 606 valid responses were collected through stratified random sampling.

2. Variable Scope

The study investigates eight core dimensions of PLC, identified through literature review and qualitative validation: Leadership Support, School Support, Shared Goals and Vision, Collaborative Culture, Teacher Motivation, Teacher Cognition, Industry-Education Integration, and Professional Development Opportunities. These variables were measured through a

structured questionnaire and analysed using semi-structured interviews, confirmatory factor analysis (CFA), and structural equation modelling.

3. Time Scope

The research was conducted between March and May 2025, including the design, distribution, and collection of the questionnaire, the conduct of semi-structured interviews, as well as statistical analysis and interpretation of the results.

Literature Review

PLC have been widely acknowledged as a strategic framework for promoting teacher collaboration, reflective practice, and sustained professional development(Stoll et al., 2006). PLC differ from traditional professional development models by emphasising shared vision, data-informed dialogue, and collective responsibility for instructional improvement (Chen, 2022). While extensively applied in basic education, the implementation and structural characteristics of PLC in vocational education remain underexplored, especially within the context of Chinese higher vocational colleges.

Research indicates that successful PLC development depends on multidimensional support systems, including strong leadership, institutional culture, motivation mechanisms, and opportunities for meaningful engagement (Belay & Melesse, 2024). In vocational settings, the alignment between educational practices and industry expectations is essential, making industry-education integration a critical but under-theorised component of PLC frameworks. Similarly, teacher cognition—such as instructional reflection, pedagogical competence, and self-efficacy—has been increasingly recognised as central to PLC sustainability.

Despite growing interest, current research often treats PLC dimensions in isolation or lacks empirical validation using structural modelling techniques. Most existing studies in China have focused on general education or descriptive case studies without developing comprehensive models tailored to vocational institutions. Therefore, this study responds to an identified gap by proposing an empirically grounded, multidimensional PLC model for higher vocational colleges in Shaanxi Province, contributing to both theoretical development and institutional practice.

Research Methodology

1. Research Design

This study employed a quantitative research design to develop and validate a PLC model tailored to higher vocational colleges in Shaanxi Province, China. A structured questionnaire was developed based on a comprehensive literature review and expert validation, targeting eight core dimensions of PLC.

2. Research Steps

The research process followed four main steps:

1) Construction of a theoretical framework and initial variable design based on prior studies;

2) Development and validation of a research instrument, including a pilot study and expert review;

3) Distribution of the questionnaire to a representative sample across vocational institutions in Shaanxi Province;

4) Statistical analysis of the data was performed using semi-structured interviews and confirmatory factor analysis (CFA).

3. Data Collection

The questionnaire was distributed online between March and May 2025 to teachers from 43 higher vocational colleges in Shaanxi. A total of 620 responses were collected, with 606 deemed valid after data screening. The respondents included teaching administrators, department heads, core teaching staff, and general faculty. The sampling method combined purposive and random sampling to ensure representation.

4. Data Analysis

Descriptive statistics (mean, standard deviation, skewness, kurtosis) were used to examine the distribution of responses. EFA was conducted to extract underlying components, applying principal component analysis with varimax rotation. CFA was then used to validate the measurement model, ensuring construct validity and model fit using indices such as CFI, TLI, RMSEA, and χ^2/df. Finally, CFA was applied to test the interrelationships among the eight dimensions and to construct the final PLC model.

Research Results

This section presents the results of data analysis, including respondent demographics, descriptive statistics of the PLC dimensions, and outcomes of confirmatory factor analysis (CFA). Unlike regression-based approaches, this study employed CFA to validate the multidimensional structure of PLC and examine the relationships among its latent constructs.

Figure 1: Measurement Model of PLC
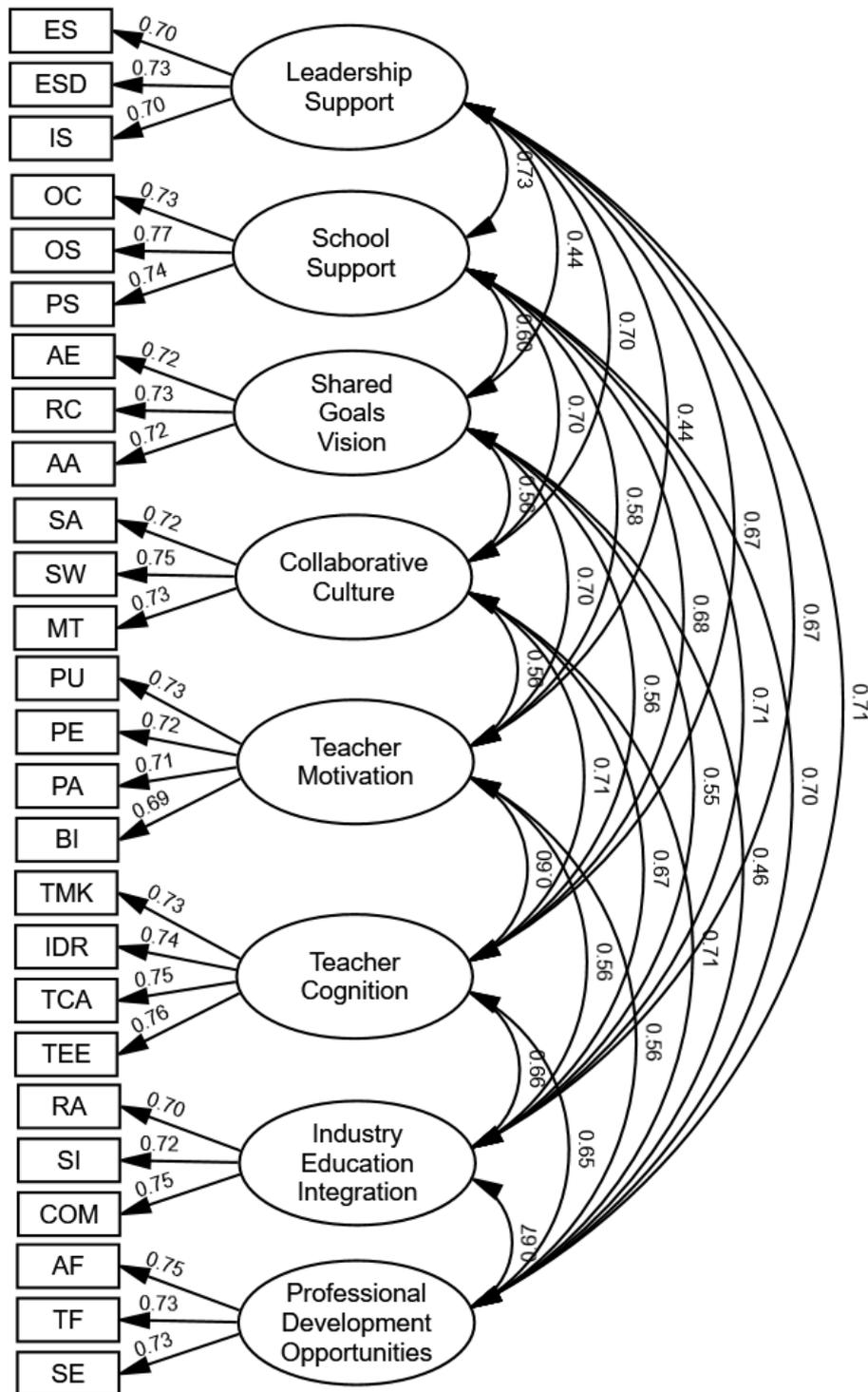
1. Demographic Profile of Respondents

The final sample consisted of 606 valid responses collected from 43 higher vocational colleges across Shaanxi Province. Among the participants, 51.16% were female and 48.84% were male. The majority (48.35%) were aged 31-40, and over 60% held the rank of lecturer or above. Respondents had varied teaching experience, with a balanced distribution across less than 5 years, 11-15 years, and more than 25 years. This demographic composition reflects the diversity of teaching roles and backgrounds in the province's vocational education system.

2. Descriptive Analysis of PLC Dimensions

Eight core dimensions were assessed to determine the current level of PLC development. All variables showed high mean scores ranging from 3.34 to 3.40 on a 5-point Likert scale, indicating a generally favourable perception of PLC practices. The highest-rated dimensions were teacher motivation (M = 3.395) and industry-education integration (M = 3.394), suggesting increasing alignment between instructional practices and industry needs.

3. Confirmatory Factor Analysis (CFA)

CFA was conducted to validate the measurement models of each latent construct. The eight dimensions—leadership support, school support, shared goals and vision, collaborative culture, teacher motivation, teacher cognition, industry-education integration, and professional development opportunities—demonstrated good model fit. Key indices for each construct exceeded recommended thresholds (CFI > 0.95, RMSEA < 0.05), confirming the construct validity of the indicators.

For example, the model for leadership support showed excellent fit: χ^2/df = 1.093, CFI = .998, RMSEA = .012, with esteem support emerging as the strongest factor loading.

4. PLC model validation

The final PLC model was validated, assessing the structural relationships among the eight dimensions. The overall model demonstrated good fit (CFI = .971, TLI = .964, RMSEA = .038), indicating that the hypothesized structure adequately reflects the data.Significant path coefficients were observed between the key dimensions. Leadership support and school support exerted strong predictive effects on collaborative culture and teacher motivation, while teacher cognition was positively influenced by motivation and shared goals. Industry-education integration also played a mediating role in professional development outcomes.

These results empirically support the multidimensional nature of PLC in vocational colleges and confirm the theoretical relevance of the eight identified factors. The validated model provides a comprehensive framework to guide institutional strategies for strengthening teacher collaboration and professional growth.

5. In Depth Interview

To enrich the theoretical development of the PLC model, semi-structured interviews were conducted with nine administrative leaders from representative higher vocational colleges in Shaanxi Province. Through thematic coding and grounded theory analysis, the interview data supported the construction of a conceptual framework consisting of three core constructs: Willingness, Competency, and Feasibility. These constructs were further linked to the eight PLC dimensions. Willingness encompassed Leadership Support, School Support, and Shared Goals and Vision, reflecting motivational drivers. Competency was informed by Teacher Cognition, Teacher Motivation, and Collaborative Culture, representing teachers' capabilities for engagement. Feasibility was grounded in Industry-Education Integration and Professional Development Opportunities, highlighting structural and contextual enablers. The interview findings helped validate and enrich the proposed PLC model by situating it within authentic institutional practices and managerial insights.

Collaborative Culture (β = 0.155, S.E. = 0.024, C.R. = 6.348) had an equally moderate effect. Although trust, sharing attitude, and member engagement were essential, their impact on PLC formation may be diffused if not supported by vision and structure. (Singha & Singha, 2024) suggested that collaboration must be embedded in day-to-day practices to influence systemic change, which could explain the moderate coefficient in this context.

Figure 2: Conceptual Framework of PLC Model Based on Interview Findings
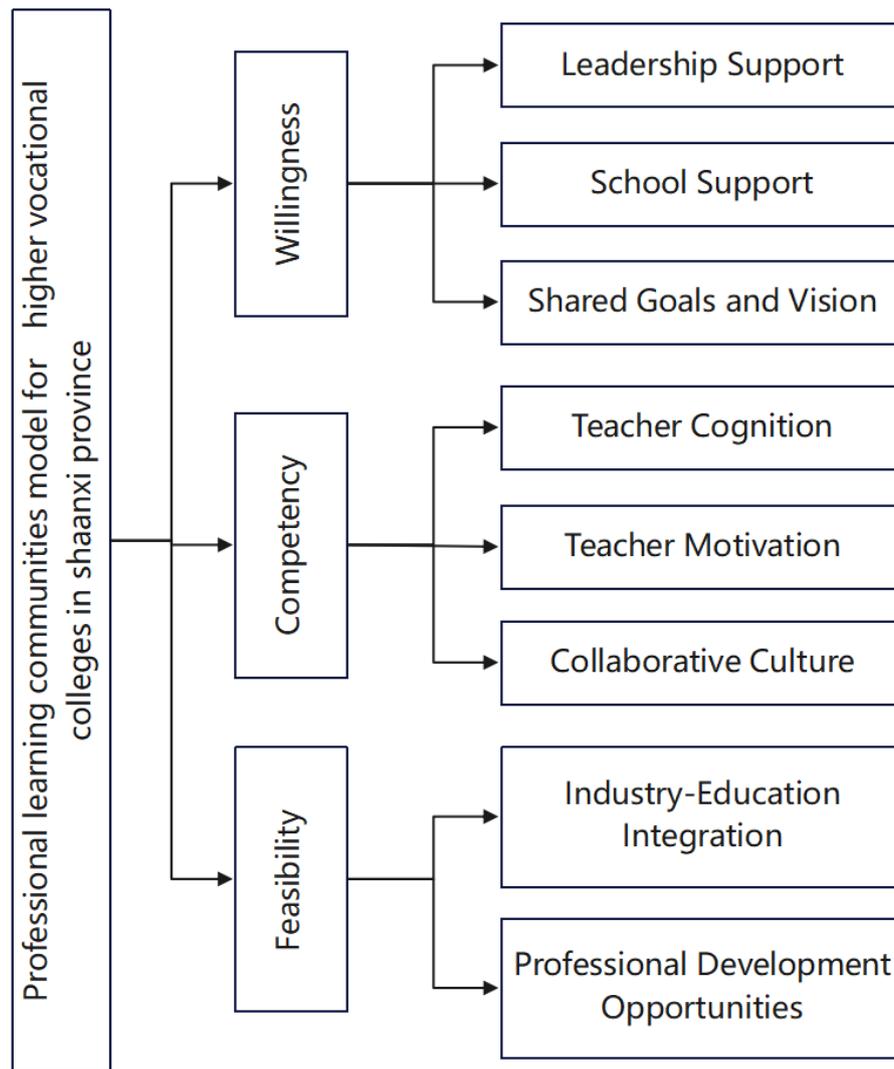
Teacher Motivation (β = 0.251, S.E. = 0.032, C.R. = 7.902) significantly predicted PLC participation, underscoring the role of internal commitment and affective readiness in sustaining peer learning. Motivated teachers are more inclined to engage in reflection, knowledge exchange, and innovation—central tenets of PLC (Thapliyal et al., 2023).

Teacher Cognition (β = 0.190, S.E. = 0.025, C.R. = 7.618) also contributed meaningfully to PLC formation. This finding supports theories asserting that PLC are not only about structure and interaction but also deeply tied to the cognitive growth of individual teachers. Reflective thinking, pedagogical awareness, and belief shifts are all cognitive dimensions that enhance PLC sustainability (Bedoya et al., 2023).

Industry-Education Integration (β = 0.196, S.E. = 0.029, C.R. = 6.743) was shown to have a significant effect on PLC. In the vocational context, where the boundary between school and industry is fluid, the inclusion of real-world demands enhances professional relevance and promotes meaningful teacher learning. This aligns with recent calls for more contextualised PLC in technical education (Huimin et al., 2018).

Professional Development Opportunities (β = 0.179, S.E. = 0.026, C.R. = 6.888) were also significant contributors. Access to ongoing, need-based training was found to facilitate PLC participation. Such opportunities help bridge theory and practice, particularly when aligned with PLC goals and delivered through collaborative modalities (Tomaskinova & Tomaskin, 2024).

Taken together, these results validate all eight proposed hypotheses and suggest that while each factor plays a role, shared goals and teacher motivation exert the strongest direct effects. In contrast, leadership and institutional support may serve more as enabling or contextual factors that support the core mechanisms of collaboration, cognition, and development.

However, the sample was limited to higher vocational colleges in Shaanxi Province, which may limit the generalizability of the findings. The cross-sectional nature of the data limits causal interpretation. While all hypotheses were statistically supported, longitudinal studies are needed to explore how these relationships evolve over time. Future research may also consider mediating and moderating variables such as digital collaboration tools or departmental autonomy.

References

Bedoya, G., Belyakova, Y., Cilliers, J., Deeb, A., Evans, D. K., Jeon, Y., & Kelly, E. (2023). *How can education systems structure virtual communities of practice for teachers most effectively? A rapid review.* Center for Global Development. https://www.jstor.org/stable/resrep48689

Belay, S., & Melesse, T. (2024). Exploring the link between teachers' motivation for continuous professional development and professional learning communities: A structural equation modelling approach. *SAGE Open, 14*(3). https://doi.org/10.1177/21582440241281855

Chen, L. (2022). Facilitating teacher learning in professional learning communities through action research: A qualitative case study in China. *Teaching and Teacher Education, 119,* 103875. https://doi.org/10.1016/j.tate.2022.103875

Cheng, C., & Zhao, J. (2023). The impact of professional learning communities on pre-service teachers' professional commitment. *Frontiers in Psychology, 14,* 1153016. https://doi.org/10.3389/fpsyg.2023.1153016

Ciampa, K., & Gallagher, T. L. (2016). Teacher collaborative inquiry in the context of literacy e ducation: Examining the effects on teacher self-efficacy, instructional and assessment practices. *Teachers and Teaching, 22*(7), 858–878. https://doi.org/10.1080/13540602.20 16.1185821

DuFour, R., DuFour, R., Eaker, R., Many, T. W., & Mattos, M. (2020). *Learning by doing: A hand book for professional learning communities at work* (Canadian version). Solution Tree Press. https://cloudfront-s3.solutiontree.com/pdf/study-guides/LBD3C_study_guide.pdf

Huimin, M., Wu, X., Yan, L., Huang, H., Wu, H., Xiong, J., & Zhang, J. (2018). Strategic plan of "Made in China 2025" and its implementation. In *Analyzing the impacts of Industry 4. 0 in modern business environments* (pp. 1–23). IGI Global. https://www.igi-global.com/ chapter/strategic-plan-of-made-in-china-2025-and-its-implementation/203109

Liu, H., & Zhang, W. (2023). Learning together and developing interactively—A review of rese arch on the construction of professional learning communities for foreign language tea chers in colleges and universities. *Foreign Languages and Literature, 40*(6), 123–127.

Singha, R., & Singha, S. (2024). Application of experiential, inquiry-based, problem-based, and project-based learning in sustainable education. In *Teaching and learning for a sustain able future: Innovative strategies and best practices* (pp. 109–128). IGI Global. https:// www.igi-global.com/chapter/application-of-experiential-inquiry-based-problem-based-a nd-project-based-learning-in-sustainable-education/337429

Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional learning com munities: A review of the literature. *Journal of Educational Change, 7*(4), 221–258. htt ps://doi.org/10.1007/s10833-006-0001-8

Thapliyal, K., Thapliyal, M., & Thomas, J. M. (2023). Critical impact and novel synergies on glo bal higher-education learning during the COVID-19 pandemic. In *Global higher educati on and the COVID-19 pandemic* (pp. 273–297). Apple Academic Press. https://doi.org/ 10.1201/9781003328582-17

Tomaskinova, J., & Tomaskin, J. (2024). Unlocking the future of education: Empowering educa tors with AI by overcoming professional development challenges. *ICERI2024 Proceedin gs,* 10633–10642. https://doi.org/10.21125/iceri.2024.2759