

DEVELOPMENT OF LEADERSHIP COMPETENCY MODEL OF ADMINISTRATORS IN VOCATIONAL COLLEGES IN SHANXI PROVINCE*

Mengmeng Wang¹, Thada Siththada² and Suttipong Boonphadung³

¹⁻³Graduate school, Suan Sunandha Rajabhat University, Thailand

Corresponding Author's Email: s66584951014@ssru.ac.th

Received 22 May 2026; Revised 2 June 2026; Accepted 4 June 2026

Abstract

This study aims to: 1) To study the level of leadership competency of administrators in vocational colleges in Shanxi Province. 2) To study the confirmatory factors analysis of leadership competency of administrators in vocational colleges in Shanxi Province. 3) To propose the development of leadership competency of administrators in vocational colleges in Shanxi Province. A mixed-methods research design was employed in this study. Quantitative data were collected through a structured questionnaire administered to 525 administrators and teachers from 35 vocational colleges in Shanxi Province, while qualitative data were obtained from semi-structured interviews with nine educational administrators. The research instrument utilized a leadership competency questionnaire developed based on relevant literature and expert validation. Data were analyzed using descriptive statistics (frequency, percentage, mean, and standard deviation) and Confirmatory Factor Analysis (CFA) with SPSS 26 and AMOS 30.

Citation:



* Mengmeng Wang, Thada Siththada and Suttipong Boonphadung. (2026). Development Of Leadership Competency Model Of Administrators In Vocational Colleges In Shanxi Province.

Modern Academic Development and Promotion Journal, 4(4), 385-404.;

DOI: <https://doi.org/10.>

<https://so12.tci-thaijo.org/index.php/MADPIADP/>

The results revealed that: (1) the overall level of leadership competency among vocational college administrators was high, with all eight dimensions—Strategic Thinking, Educational Vision, Organizational Management, Innovation Capability, Communication Competence, Cultural Responsiveness, Self-Leadership, and Digital Leadership—rated highly; (2) the CFA results supported the eight-factor model, demonstrating satisfactory model fit, construct validity, and reliability; and (3) qualitative findings indicated that leadership competency development should emphasize strategic planning, digital transformation, communication effectiveness, innovation, and continuous professional development to enhance administrative effectiveness in vocational colleges. These findings confirm that the proposed leadership competency model is both theoretically sound and practically applicable within the vocational education context of Shanxi Province.

Keywords: Leadership competency model, vocational college administrators, vocational education, confirmatory factor analysis, mixed methods, Shanxi Province

Introduction

China's higher vocational education has entered a stage of high-quality development driven by national strategic reforms. Since the implementation of the National Vocational Education Reform Implementation Plan in 2019, vocational education has been positioned as a crucial component of China's education system, significantly contributing to industrial upgrading and talent development. Subsequent policies, including the Opinions on Promoting High-Quality Development of Modern Vocational Education (2021) and the Outline for Building a Strong Education Nation (2024–2035), have further underscored the importance of system modernization and the enhancement of governance capacity.

Against this backdrop, vocational colleges have rapidly expanded both in scale and significance. As essential providers of skilled talent, they are increasingly expected to adapt to economic restructuring and regional industrial transformation, particularly in resource-based areas such as Shanxi Province, which is transitioning from traditional heavy industries to high-tech and green development.

Despite their increasing strategic importance, the leadership capacity in vocational colleges continues to be a significant bottleneck for institutional development. Effective governance necessitates administrators who can integrate strategic planning, organizational coordination, innovation management, and digital transformation. Prior research has demonstrated that leadership competence significantly influences institutional effectiveness and educational quality (Kalkan et al., 2020). However, the current leadership development initiatives in vocational education remain inadequately systematized.

International organizations such as the OECD (2021) and UNESCO-UNEVOC (2022) emphasize that leaders in vocational education must possess competencies in collaboration, innovation, and adaptive governance. Similarly, empirical studies suggest that leadership effectiveness is influenced by both individual traits and organizational contexts (Liu et al., 2025). In China, while studies have examined leadership competencies and governance models, research specifically focusing on vocational education leadership remains limited and fragmented (Sun, 2025).

To address these gaps, this study is theoretically grounded in McClelland's competency theory, which emphasizes that individual performance is determined by underlying competencies rather than surface-level skills, and transformational leadership theory, which highlights leaders' roles in driving organizational change, innovation, and collective vision formation

in complex institutional environments. These two theoretical perspectives jointly provide a robust framework for understanding leadership effectiveness in vocational education contexts.

Against the backdrop of rapid industrial restructuring in Shanxi Province, vocational college administrators are confronted with increasingly complex governance challenges. However, in practice, many institutions continue to exhibit several structural deficiencies, including insufficient digital governance capacity, limited strategic planning coherence, weak inter-departmental coordination, and an overreliance on traditional administrative management models. These limitations hinder the ability of vocational colleges to respond effectively to ongoing educational reforms and regional development demands.

The economic transformation of Shanxi Province—from resource-dependent heavy industries toward high-tech, green, and sustainable development—further intensifies the demand for adaptive and future-oriented educational leadership. This transition requires vocational colleges to align talent cultivation systems with emerging industrial structures, thereby placing higher demands on administrators’ capabilities in digital transformation, innovation management, and strategic foresight.

Based on this theoretical and contextual foundation, this study constructs a multidimensional leadership competency model for vocational college administrators. The model identifies eight key dimensions: Strategic Thinking, Educational Vision, Organizational Management, Innovation Capability, Collaborative Communication, Cultural Responsiveness, Self-Leadership, and Digital Leadership, which collectively reflect the competencies required for effective leadership in the evolving vocational education landscape of China.

Objectives

1) To study the level of leadership competency of administrators in vocational colleges in Shanxi Province.

2) To study the confirmatory factors analysis of leadership competency of administrators in vocational colleges in Shanxi Province.

3) To propose the development of leadership competency of administrators in vocational colleges in Shanxi Province.

Literature review

Definitions of Leadership Competency

Leadership competency (LC) is rooted in competency theory. McClelland (1973) first introduced the concept of "competency," arguing that traditional intelligence-based assessments are inadequate for predicting job performance. He emphasized the importance of underlying personal attributes, such as motivation, interpersonal understanding, and behavioral tendencies. Building on this foundation, Boyatzis (1982) conceptualized competency as an integrated system of knowledge, skills, and behaviors, underscoring its significance in managerial effectiveness. Spencer and Spencer (1993) further operationalized competency through behavioral indicators, facilitating the systematic assessment and development of performance-related capabilities.

In educational contexts, leadership competency is widely recognized as a key determinant of institutional effectiveness. Day et al (2016) demonstrated that leadership practices, including strategic vision, instructional leadership, and organizational management, significantly enhance school performance and student outcomes. Furthermore, international organizations such as the OECD (2021) and UNESCO-UNEVOC (2022) emphasize that contemporary leaders must possess cross-cultural awareness, digital adaptability, and collaborative problem-solving capabilities to effectively respond to globalization and

technological change.

From a theoretical perspective, leadership competency has evolved from two complementary views: a static perspective that emphasizes structured traits and capability components (Boyatzis, 1982), and a dynamic perspective that focuses on competency development through learning, reflection, and contextual interaction (Avolio & Gardner, 2005). Recent studies further underscore the significance of cultural embeddedness and value-driven leadership development across diverse institutional contexts (Li, 2024).

Dimensions of Leadership Competency

The dimensional structure of leadership competency has been extensively examined in both international and Chinese contexts, although a complete consensus has yet to be reached. International studies emphasize the multidimensional nature of leadership capabilities, which include strategic planning, organizational development, relational leadership, and cultural responsiveness. For instance, Youngs and King (2002) underscore the significance of trust-building and the development of organizational capacity in the context of school improvement. Similarly, Scanlan and López (2012) identify language support, curriculum quality, and sociocultural integration as essential competencies within multicultural educational environments. Furthermore, Giles and Bills (2017) highlight relational leadership and shared commitment as fundamental elements that shape organizational culture.

In the context of Chinese higher education, competency dimensions are frequently linked to administrative roles and institutional governance. Research has identified strategic decision-making, organizational coordination, communication skills, innovation capacity, and policy implementation as fundamental components of leadership competency (Yang et al., 2019). In vocational education, there is an additional focus on school–enterprise collaboration, resource integration, and institutional innovation (Pan & Wang, 2023). Overall, the existing literature indicates that leadership competency in

educational institutions encompasses both universal managerial dimensions and context-specific institutional requirements. Nevertheless, there remains a significant gap in the systematic integration of these dimensions within vocational education settings, especially in region-specific contexts such as Shanxi Province.

Development of Leadership Competency

The development of leadership competency is widely recognized as a dynamic and continuous process shaped by experience, reflection, and organizational context. International research emphasizes experiential learning and reflective cycles as key mechanisms in the development of competency. Day and Dragoni (2015) propose a model based on the experience–reflection–feedback cycle, suggesting that leadership capability is gradually formed through iterative practice. The widely cited '70–20–10 model' (McCauley et al., 2010) further indicates that leadership development is primarily driven by on-the-job experience (70%), social learning (20%), and formal training (10%). Additionally, Hallinger and Kulophas (2020) emphasize that the development of leadership competency is multidimensional and is progressively constructed through global and cross-cultural interactions.

In the Chinese context, the development of competencies is significantly influenced by policy orientation and institutional reform. Research indicates that leadership competencies in vocational education are cultivated through the integration of industry and education, collaboration between schools and enterprises, and innovative institutional practices (He & Li, 2022). Case studies further illustrate that strategic planning, governance reform, and project-based management serve as crucial pathways for the formation of competencies in vocational colleges (Zhuang, 2021). Despite these findings, both international and Chinese literature concur that the development of leadership competencies remains inadequately systematized within vocational education contexts.

Notably, there is a dearth of empirical models that elucidate how competencies evolve within specific regional and institutional environments.

Summary and Research Gap

In summary, existing literature conceptualizes leadership competency as a multidimensional, dynamic, and context-dependent construct. Theoretical development has progressed from static trait-based models to dynamic, learning-oriented frameworks, while dimensional research has identified both universal and context-specific leadership capabilities. However, three key gaps remain. First, existing competency frameworks are largely derived from general management theories and lack adaptation to vocational education contexts. Second, empirical validation of competency structures in vocational colleges remains limited. Third, region-specific research—particularly in resource-based provinces such as Shanxi—continues to be insufficient. Therefore, this study aims to construct and empirically validate a leadership competency model for vocational college administrators in Shanxi Province, integrating both universal leadership theories and localized institutional characteristics.

Methodology

This study employed a cross-sectional survey design targeting administrators and teachers in vocational colleges across Shanxi Province, China, which comprised 49 institutions at the time of data collection. A multistage stratified sampling technique was adopted to ensure representativeness across different institutions. In the first stage, 35 vocational colleges were selected from the total of 49 to reflect both regional distribution and institutional diversity. In the second stage, respondents were chosen from two groups within each institution: administrators and teachers. A fixed allocation strategy was implemented, including 5 administrators and 10 teachers per institution, to ensure adequate statistical power for Confirmatory Factor Analysis (CFA).

Consequently, the total sample size was calculated as $n = (35 \times 5) + (35 \times 10) = 175 + 350 = 525$ respondents. The adequacy of the sample size was further evaluated based on CFA requirements. Given that the measurement model consisted of 8 latent variables measured by 32 observed indicators, and adhering to the recommended ratio of 10–15 respondents per observed variable, the required sample size ranged from 320 to 480 cases. Since the actual sample size ($n = 525$) exceeded this threshold, it was deemed sufficient for reliable parameter estimation and model validation.

The research instrument utilized in this study comprised a structured questionnaire and a semi-structured interview protocol. The questionnaire was organized into two sections. The first section gathered demographic information, including participants' positions, gender, age, educational background, and work experience. The second section assessed the leadership competencies of administrators in vocational colleges within Shanxi Province. The measurement model encompassed eight dimensions, each containing four items, resulting in a total of 32 items. A five-point Likert scale was employed, with responses ranging from 1 (very low level) to 5 (very high level).

The development of the questionnaire adhered to a systematic procedure. Initially, relevant literature, textbooks, and empirical studies on leadership competencies in vocational education were reviewed to construct the initial item pool. Subsequently, items were developed based on the proposed conceptual framework. The draft questionnaire was then reviewed by the thesis supervisor and a panel of experts to ensure content validity. Revisions were made in accordance with the feedback provided by the experts.

Data analysis was performed using IBM SPSS version 26 and IBM AMOS version 30. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were employed to analyze demographic characteristics and competency levels. The criteria for interpreting mean scores were defined as

follows: 4.51–5.00 (very high), 3.51–4.50 (high), 2.51–3.50 (moderate), 1.51–2.50 (low), and 1.00–1.50 (very low).

Confirmatory Factor Analysis (CFA) was employed to validate the measurement model of leadership competency. The analysis focused on standardized factor loadings, composite reliability (CR), average variance extracted (AVE), and model fit indices. The model fit criteria included $\chi^2/df < 3$, GFI > 0.90, AGFI > 0.90, TLI > 0.95, CFI > 0.95, RMR < 0.08, and RMSEA < 0.08 (Marsh et al., 2020). Reliability was assessed using Cronbach's alpha and composite reliability, while convergent validity was evaluated through factor loadings and AVE. Discriminant validity was determined by comparing the square root of AVE with inter-construct correlations. These criteria ensured that the measurement model possessed satisfactory psychometric properties for further structural analysis.

Ethical considerations were rigorously upheld throughout the study. Participation was entirely voluntary, and informed consent was obtained from all respondents prior to data collection. Confidentiality and anonymity were preserved through coding procedures and the removal of identifying information. All data were utilized exclusively for academic purposes, and the findings were reported honestly, without fabrication or misrepresentation. The study adhered to established ethical standards in educational research, ensuring respect for participants' rights and maintaining academic integrity.

Results

1. Demographic Characteristics of Respondents

The final sample comprised 525 valid respondents from 35 vocational colleges in Shanxi Province. Administrative staff represented the largest proportion of respondents (41.9%), followed by department- and faculty-level administrators (27.6%), full-time faculty members (24.6%), and university-level

administrators (5.9%). Female respondents accounted for 79.6% of the sample.

Regarding age distribution, the majority of respondents were aged 40–49 years (51.2%), followed by those aged 30–39 years (25.3%) and 21–29 years (18.7%). Smaller proportions were aged 50–59 years (4.6%) and 60 years and above (0.2%).

In terms of educational attainment, most respondents held a master's degree (71.3%), followed by a bachelor's degree (19.2%), an associate degree (7.4%), and a doctoral degree (2.1%). Regarding work experience, 40.2% had worked for 16–20 years, followed by 21.0% with 5–10 years of experience, 20.0% with less than 5 years, 15.6% with 11–15 years, and 3.2% with more than 20 years of service.

2. Descriptive statistics

Descriptive statistical analysis was conducted to examine the level of leadership competency among vocational college administrators. The findings revealed that the overall level of leadership competency was high.

As presented in Table 1, all eight dimensions achieved high mean scores. Cultural Responsiveness ($M = 3.923$, $SD = 0.625$) and Communication Competence ($M = 3.922$, $SD = 0.594$) obtained the highest mean scores among the dimensions examined. These were followed by Educational Vision ($M = 3.909$, $SD = 0.602$), Self-Leadership ($M = 3.904$, $SD = 0.609$), Digital Leadership ($M = 3.896$, $SD = 0.599$), Organizational Management ($M = 3.870$, $SD = 0.528$), Strategic Thinking ($M = 3.857$, $SD = 0.635$), and Innovation Capability ($M = 3.822$, $SD = 0.556$). Despite minor differences in mean values, all dimensions were rated at a high level.

Table 1 Descriptive Statistics of Leadership Competency Dimensions

Variable	Mean	S.D.	Skewness	Kurtosis	Level
Strategic Thinking (ST)	3.857	.635	-.348	.822	High
Educational Vision (EV)	3.909	.602	-.392	1.113	High
Organizational Management (OM)	3.870	.528	-.280	.998	High
Innovation Capability (IC)	3.822	.556	-.347	.843	High
Communication Competence (CC)	3.922	.594	-.240	.608	High
Cultural Responsiveness (CRS)	3.923	.625	-.456	.644	High
Self-Leadership (SL)	3.904	.609	-.137	.290	High
Digital Leadership (DL)	3.896	.599	-.025	-.217	High

3. CFA Results

Confirmatory Factor Analysis

A second-order Confirmatory Factor Analysis (CFA) was performed to validate the proposed leadership competency model. The model consisted of eight latent constructs: Strategic Thinking (ST), Educational Vision (EV), Organizational Management (OM), Innovation Capability (IC), Communication Competence (CC), Cultural Responsiveness (CRS), Self-Leadership (SL), and Digital Leadership (DL), represented by a total of 32 observed variables.

The standardized factor loadings of the eight first-order constructs ranged from 0.77 to 0.98. Among the latent dimensions, Communication Competence demonstrated the highest loading ($\beta = 0.98$), followed by Innovation Capability and Self-Leadership ($\beta = 0.95$), Organizational Management and Digital Leadership ($\beta = 0.94$), Cultural Responsiveness ($\beta = 0.93$), Educational Vision ($\beta = 0.88$), and Strategic Thinking ($\beta = 0.77$).

At the indicator level, all observed variables exceeded the recommended threshold of 0.60, indicating satisfactory indicator reliability and construct representation.

Model Fit Assessment

The results demonstrated that the proposed second-order CFA model achieved an acceptable level of fit with the empirical data. Specifically, the model yielded $\chi^2 = 1220.730$, $df = 456$, $\chi^2/df = 2.677$, $GFI = 0.874$, $AGFI = 0.854$, $TLI = 0.945$, $CFI = 0.949$, $RMR = 0.021$, and $RMSEA = 0.057$. Overall, most fit indices met or exceeded the recommended thresholds, particularly TLI, CFI, RMR, and RMSEA, indicating a good model fit, although GFI and AGFI were slightly below the conventional cut-off value of 0.90. Considering the balance of all indices, the model fit was deemed acceptable.

Reliability and Convergent Validity

Composite Reliability (CR) and Average Variance Extracted (AVE) were calculated to assess internal consistency reliability and convergent validity.

As shown in Table 2, all CR values ranged from 0.868 to 0.930, exceeding the recommended threshold of 0.70. Communication Competence exhibited the highest CR value (0.930), while Strategic Thinking showed the lowest value (0.868), which remained within the acceptable range.

Similarly, all AVE values ranged from 0.625 to 0.770, exceeding the recommended minimum criterion of 0.50. Communication Competence demonstrated the highest AVE value (0.770), while Strategic Thinking (0.625) and Innovation Capability (0.626) recorded comparatively lower values. These findings confirmed satisfactory convergent validity for all constructs.

Table2 Convergent validity and Discriminant validity

Construct	Observed Varianles	Std Estimate	CR	AVE
ST	SIV	.765	0.868	0.625
	SEC	.641		
	PEL	.832		
	SRL	.902		
EV	SSA	.834	0.894	0.679
	CIC	.765		
	VC	.912		
	SFO	.778		
OM	OCF	.827	0.885	0.659
	MC	.704		
	LSI	.853		
	IMM	.854		
IC	IL	.838	0.870	0.626
	IOZC	.727		
	PDI	.745		
	IP	.848		
CC	SNC	.895	0.930	0.770
	STC	.862		
	TCC	.876		
	OCC	.876		
CRS	CS	.806	0.894	0.679
	CVL	.821		
	CIP	.823		

	CQ	.845		
SL	SC	.871		
	ER	.802		
	SM	.862	0.900	0.694
	SFR	.794		
DL	DTL	.838		
	DPM	.838		
	DGC	.835	0.902	0.696
	DVL	.827		

4. Model validation using interviews

Semi-structured interviews were conducted with nine educational administrators from vocational colleges in Shanxi Province (Interview data). The qualitative data were used to triangulate and support the quantitative findings.

The results indicate that the proposed leadership competency model comprising eight dimensions—Strategic Thinking (ST), Educational Vision (EV), Organizational Management (OM), Innovation Capability (IC), Communication Competence (CC), Cultural Responsiveness (CR), Self-Leadership (SL), and Digital Leadership (DL)—is consistent with participants' practical leadership experiences in vocational colleges.

Overall, the interview findings suggest that the proposed model is contextually relevant to vocational college administration in Shanxi Province and aligns with observed leadership practices (Interview data).

Conclusion

Conclusion 1: Overall Level of Leadership Competency

The leadership competencies of administrators in vocational colleges in Shanxi Province are generally assessed to be at a relatively high level across all eight dimensions: Strategic Thinking, Educational Vision, Organizational Management, Innovation Capability, Communication Competence, Cultural Responsiveness, Self-Leadership, and Digital Leadership. This finding suggests a balanced development of leadership capabilities among the sample population.

Conclusion 2: Validity of the Leadership Competency Model

The proposed eight-dimensional leadership competency model exhibits satisfactory reliability and validity, as evidenced by the results of confirmatory factor analysis (CFA) and qualitative content analysis. The model demonstrates strong construct validity, convergent validity, and discriminant validity, thereby affirming its suitability for evaluating leadership competency among vocational college administrators.

Conclusion 3: Empirical and Theoretical Support for the Model

The integration of quantitative and qualitative findings substantiates that the leadership competency model is both theoretically grounded and empirically supported. This model aligns with actual leadership practices in vocational colleges in Shanxi Province, demonstrating its applicability for leadership assessment, development, and the enhancement of institutional governance.

Recommendations

Recommendations for Schools

Vocational colleges should enhance the systematic development of administrators' leadership competencies across all eight dimensions identified in this study. In particular, greater emphasis should be placed on Innovation

Capability, Digital Leadership, and Communication Competence, as these areas are critical for institutional modernization and transformation. Additionally, schools are encouraged to establish structured leadership training programs, promote cross-departmental collaboration, and provide continuous professional development opportunities to enhance strategic and adaptive leadership capacities. Furthermore, mentoring systems and practice-based leadership development activities should be strengthened to bridge the gap between theory and practice.

Recommendations for Policymakers

Educational policymakers should further refine leadership development policies for vocational college administrators by integrating competency-based frameworks into training, evaluation, and promotion systems. A standardized leadership competency assessment system can be developed based on the eight-dimensional model proposed in this study to ensure consistency and fairness in leadership evaluation. Additionally, policymakers should enhance support for regional vocational education development, particularly in resource-dependent provinces such as Shanxi, by allocating targeted resources and promoting alignment between institutional governance and industrial development needs. Furthermore, policies should advocate for digital transformation and innovation-oriented leadership practices within vocational education institutions.

Recommendations for Future Research

Future research should further validate the proposed leadership competency model across various regions and institutional contexts to enhance its generalizability. Comparative studies across provinces or countries are recommended to explore the contextual differences in leadership competency structures. Additionally, longitudinal research designs should be employed to examine the dynamic development process of leadership competency over

time. Future studies may also integrate additional methodological approaches, such as mixed-methods or experimental designs, to deepen the understanding of the causal mechanisms underlying the development of leadership competency in vocational education settings.

References

- Avolio, B. J., & Gardner, W. L. (2005). Authentic leadership development: Getting to the root of positive forms of leadership. *The Leadership Quarterly*, 16(3), 315–338.
- Boyatzis, R. E. (1982). *The competent manager: A model for effective performance*. New York: John Wiley & Sons.
- Day, C., Gu, Q., & Sammons, P. (2016). The impact of leadership on student outcomes: How successful school leaders use transformational and instructional strategies to make a difference. *Educational administration quarterly*, 52(2), 221-258.
- Day, D. V., & Dragoni, L. (2015). Leadership development: An outcome-oriented review based on time and levels of analyses. *Annual Review of Organizational Psychology and Organizational Behavior*, 2, 133–156.
- Giles, D., & Bills, A. (2017). Designing and using an organisational culture inquiry tool to glimpse the relational nature of leadership and organisational culture within a South Australian primary school. *School Leadership & Management*, 37(1–2), 1–16.
- Hallinger, P., & Kulophas, D. (2020). The evolution of leadership competency research in higher education. *Higher Education*, 79(5), 831–852.
- He, Z., & Li, C. (2022). Study on principals' school-governing capabilities under the "Double High Plan" background in higher vocational colleges. *China Vocational and Technical Education*, (15), 12–18.

- Kalkan, Ü., Altınay Aksal, F., Altınay Gazi, Z., Atasoy, R., & Dağlı, G. (2020). The relationship between school administrators' leadership styles, school culture and organizational image. *SAGE Open*, 10(1), Article 21582440 20902081.
- Li, L. (2024). Conceptual framework and practical approaches to global leadership competencies for cadres in the new era. *Leadership Science*, 2024(6), 36–41.
- Liu, L., Li, Q., & Bao, H. (2025). Principal leadership enhancement: Personality traits or organizational environment? *Journal of East China Normal University (Educational Sciences Edition)*, 43(6), 99–115.
- Marsh, H. W., Guo, J., Dicke, T., Parker, P. D., & Craven, R. G. (2020). Confirmatory factor analysis (CFA), exploratory structural equation modeling (ESEM), and set-ESEM: Optimal balance between goodness of fit and parsimony. *Multivariate behavioral research*, 55(1), 102-119.
- McCauley, C. D., Van Velsor, E., & Ruderman, M. (Eds.). (2010). *The Center for Creative Leadership handbook of leadership development*. (3rd ed.). Jossey-Bass. ISBN: 978-0470387399
- McClelland, D. C. (1973). Testing for competence rather than for intelligence. *American Psychologist*, 28(1), 1–14.
- OECD. (2021). *Teachers and leaders in vocational education and training*. OECD Publishing.
- Pan, M., & Wang, H. (2023). Development of principal competencies under the orientation of vocational education types. *China Vocational and Technical Education*, (10), 5–11.
- Scanlan, M., & López, F. A. (2012). ¡Vamos! How school leaders promote equity and excellence for bilingual students. *Educational Administration Quarterly*, 48(4), 583–622.

- Spencer, L. M., & Spencer, S. M. (1993). *Competence at work: Models for superior performance*. New York: John Wiley & Sons.
- Sun, S. (2025). Rethinking core leadership of principals. *Education View*, (1), 26–28.
- UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training. (2022). *UNESCO strategy for technical and vocational education and training (TVET) 2022–2029: Transforming technical and vocational education and training for successful and just transitions*. UNESCO.
- Yang, S., Ying, J., & Wang, Q. (2019). Research on the current situation and improvement strategies of middle-level leadership competencies in universities in the new era. *Higher Education of Architecture*, 28(6), 148–154.
- Youngs, P., & King, M. B. (2002). Principal leadership for professional development to build school capacity. *Educational Administration Quarterly*, 38(5), 643–670.
- Zhuang, X.-Z. (2021). Levels and strategies of industry-education integration. *Educational Research*, (8), 45–5