Creative Leadership Competencies and Preschool Teachers' Performance: The Mediating Role of Teachers' Creativity and the Moderating Role of Organizational Climate in Fostering Educational Innovation

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***Abstract*—Creative leadership has been recognized as a crucial driver of educational innovation, yet few studies have examined the mechanisms by which it enhances Preschool Teachers' Performance (PTP) in the Chinese context. This present study analyzed the effects of Creative Leadership Competencies (CLC) on PTP through the mediating role of Teachers' Creativity (TC) and the moderating role of Organizational Climate (OC). Data were collected from 412 preschool teachers in Hebei Province, China, and analyzed by using Partial Least Squares Structural Equation Modeling (PLS-SEM) and Hayes' PROCESS Macro (Model 7). The results revealed that CLC had a significant predictive power for TC ($p < 0.001$, $\beta = 0.563$) and PTP ($p < 0.001$, $\beta = 0.231$), and TC had a significant enhancing predictive power for PTP ($p < 0.001$, $\beta = 0.406$). The moderating effect of OC on the CLC-TC relationship was significant ($\beta = 0.114$, $p = 0.007$), and the index of moderated mediation (0.071, 95% CI [0.021, 0.125]) indicated that supportive OC enhances the indirect effect of CLC on PTP through TC. These findings further expand creative leadership theory by demonstrating the interactive roles of individual creativity and organizational context in early childhood education. Practically, this study highlights that developing creativity-oriented leadership and fostering collaborative organizational climates are essential strategies for achieving sustainable educational innovation and improved teacher performance.**

***Keywords*—creative leadership, teacher creativity, organizational climate, preschool education, teacher performance, educational innovation**

I. Introduction

In the last decade, the global Early Childhood Education (ECE) field has undergone significant change, shaped by rapid societal transformation, emerging pedagogical paradigms, and increased policy attention to innovation and teacher quality [1]. Preschool institutions are no longer considered only child-care centres, but are increasingly recognised as foundational environments for fostering children's creativity and long-term development. Hence, the leadership competencies of preschool administrators and head teachers have become important determinants of educational quality, teacher performance, and innovative teaching practices [2].

Leadership in educational settings has shifted from traditional administrative management toward more dynamic, creativity-oriented approaches that emphasize adaptability, vision, and innovation. Creative leadership competencies explain this shift by integrating cognitive, behavioural, and emotional capacities that enable leaders to inspire creativity, encourage experimentation, and facilitate collaborative problem-solving [3]. These competencies are particularly salient in ECE, where learning environments are less structured, and teachers must continuously design engaging, child-centred activities [4]. Empirical studies suggest that leaders who demonstrate creativity-supportive behaviours such as openness to ideas, flexibility, and tolerance for risk create conditions that enhance teacher creativity and motivation [5, 6]. Recent studies have examined the role of leadership competencies in educational settings, highlighting how leader actions can influence teacher creativity and performance [7].

Teacher creativity has been widely identified as a key predictor of pedagogical innovation, instructional quality, and student engagement. Creative teachers are more likely to employ innovative instructional strategies, effectively integrate play-based learning, and address classroom challenges with originality and sensitivity. In early childhood settings, where teachers face unpredictable classroom dynamics and evolving curricular demands, creativity enables flexible, developmentally appropriate learning opportunities. However, teacher creativity does not develop in isolation. It is shaped by leadership practices, professional support, and the broader organisational context [5].

Organisational climate, defined as shared perceptions of workplace values, norms, and practices, has been increasingly recognised as a contextual factor influencing teacher engagement, creativity, and effectiveness [8]. A supportive climate characterised by trust, collaboration, and transparency can amplify the positive effects of creative leadership by enhancing teachers' psychological empowerment and willingness to engage in creative practices. Conversely, a restrictive or bureaucratic climate may suppress intrinsic motivation and weaken the translation of leadership influence into performance outcomes. In ECE institutions, where emotional labour, teamwork, and innovation are central, organisational climate often determines whether creative leadership translates into tangible improvements in teaching practice [3].

Collectively, creative leadership competencies, teachers' creativity, and organisational climate represent an interconnected system through which preschools foster educational innovation. Innovation in this context extends

beyond technological adoption to include pedagogical experimentation, curriculum adaptation, and creative classroom management aligned with twenty-first-century learning goals. Although prior research has examined leadership-creativity relationships in higher education and corporate settings [9], empirical evidence explaining how these mechanisms operate in preschool contexts remains limited. Given the unique challenges of early childhood education, including resource constraints, emotional demands, and community expectations, understanding these dynamics is essential for achieving sustainable educational improvement [4].

Although creative leadership has been widely acknowledged as a catalyst for innovation at both organisational and individual levels, the mechanisms and contextual conditions through which creative leadership competencies influence preschool teachers' performance remain insufficiently understood. Three key gaps can be identified in the existing literature. First, the mediating role of teachers' creativity has not been adequately examined within early childhood education. While studies in K-12 and higher education contexts suggest that creativity mediates the relationship between leadership behaviours and performance [10], empirical validation in preschool settings is scarce. Given that early childhood teachers rely heavily on creative strategies to engage learners through play-based and exploratory activities, understanding creativity as a psychological and behavioural pathway linking leadership to performance is both theoretically and practically important. The absence of such models limits the development of leadership training programs that explicitly cultivate creativity-supportive competencies.

Second, the moderating role of organisational climate remains underexplored. Research in educational management indicates that leadership effectiveness depends on contextual factors, including trust, collaboration, and recognition [11]. Supportive organisational climates enhance teachers' willingness to take creative risks, whereas unsupportive climates undermine intrinsic motivation and innovation. However, few studies have empirically tested whether organisational climate moderates the relationship between creative leadership and teachers' creativity, or whether it conditions the indirect pathway to teacher performance in preschool settings. Ignoring such contextual influences risks oversimplifying the complex dynamics underlying educational innovation.

Finally, a contextual and competency-based gap persists in early childhood education research. Although leadership competency frameworks for preschool administrators have been proposed across various regions [12], empirical research has yet to link these competencies to concrete teacher outcomes, such as creativity and performance. Moreover, previous studies have predominantly focused on broad leadership styles (e.g., transformational or distributed leadership) rather than creative leadership competencies as measurable, developable skills. Consequently, empirical evidence explaining how creative leadership competencies promote educational innovation through specific psychological and contextual mechanisms in preschools remains limited [13, 14].

II. Literature Review

A. Creative Leadership Competencies and Teachers' Performance

Creative leadership has increasingly been recognized as a critical approach for fostering innovation and enhancing performance in knowledge-intensive, human-centered professions, including education. Unlike traditional leadership styles that emphasize control and standardization, creative leadership focuses on enabling originality, experimentation, and adaptive problem-solving through cognitive, behavioral, and emotional competencies. These competencies allow leaders to cultivate environments that encourage flexibility, autonomy, and continuous improvement, which are essential for sustaining innovation.

In educational settings, leadership plays a pivotal role in shaping teachers' motivation, instructional practices, and professional commitment. Prior research across primary, secondary, and higher education contexts has demonstrated that creativity-supportive leadership behaviours, such as intellectual stimulation, openness to new ideas, and encouragement of experimentation, are positively associated with teachers' instructional effectiveness and job performance [5, 14]. Although these studies were conducted at different educational levels, the underlying theoretical mechanisms are directly applicable to early childhood education. Preschool teachers operate in less standardised instructional environments and must continuously adapt teaching strategies to children's developmental needs, making leadership support for creativity particularly influential.

In preschool settings, leaders with strong creative leadership competencies are better positioned to empower teachers, legitimise innovative pedagogical practices, and reduce fear of failure. Such leadership behaviours are expected to directly enhance preschool teachers' performance by fostering engagement, adaptability, and instructional quality.

H1: Creative leadership competencies positively influence preschool teachers' performance.

B. Creative Leadership Competencies and Teachers' Creativity

Creative leadership theory emphasises that leaders influence creativity not by prescribing ideas, but by shaping motivational and cognitive conditions that support creative engagement [13]. Leaders who demonstrate openness, tolerance for ambiguity, and support for risk-taking create psychologically safe environments in which individuals feel encouraged to explore novel ideas and approaches. These conditions are especially relevant in early childhood education, where creativity is central to play-based learning and child-centred pedagogy.

Empirical studies across educational contexts consistently indicate that leadership behaviours emphasising autonomy support and intellectual stimulation are positively associated with teachers' creativity [5, 11]. Although much of this evidence originates from primary and secondary education, the core psychological processes, such as intrinsic motivation and cognitive flexibility, are arguably more pronounced in preschool settings, where teaching practices require

continuous innovation and responsiveness to children's interests.

Given that preschool teachers rely heavily on creativity to design engaging learning environments, creative leadership competencies are expected to be a key antecedent of teachers' creative engagement.

H2: Creative leadership competencies positively influence teachers' creativity.

C. Teachers' Creativity and Preschool Teachers' Performance

Teachers' creativity refers to the ability to generate novel and useful instructional ideas, adapt pedagogical strategies, and respond flexibly to classroom challenges. From the perspective of Amabile's Componential Theory of Creativity, creativity enhances performance by strengthening intrinsic motivation, problem-solving capacity, and task engagement [13]. In educational contexts, creative teachers are more likely to design innovative lessons, integrate play and inquiry, and create emotionally supportive learning environments.

Research across educational levels has shown that teacher creativity is positively associated with instructional effectiveness, student engagement, and professional performance [15]. In early childhood education, where learning outcomes are closely tied to emotional interaction and exploratory activities, creativity is a particularly critical resource for performance. Creative teachers can better accommodate diverse developmental needs and foster meaningful learning experiences.

Accordingly, it is expected that higher levels of teachers' creativity will translate into improved performance outcomes in preschool settings:

H3: Teachers' creativity positively influences preschool teachers' performance.

D. The Mediating Role of Teachers' Creativity

While leadership may exert a direct influence on teacher performance, theory suggests that this relationship is often indirect and operates through psychological mechanisms. Self-Determination Theory posits that leadership behaviours that foster autonomy and competence enhance intrinsic motivation, which, in turn, improves performance outcomes [16]. Within this framework, teachers' creativity represents a key motivational and behavioural pathway through which creative leadership competencies affect performance.

Prior studies in broader educational contexts suggest that creativity mediates the relationship between leadership and performance by translating leadership support into concrete pedagogical innovation [10]. However, empirical examination of this mechanism remains limited in preschool education, despite creativity's centrality in early childhood pedagogy. Given the creative demands placed on preschool teachers, leadership-induced creativity is expected to play a crucial mediating role.

H4: Teachers' creativity mediates the relationship between creative leadership competencies and preschool teachers' performance.

E. The Moderating Role of Organisational Climate

Organisational climate reflects shared perceptions of norms, values, and practices that shape employees' attitudes and behaviours. The interactionist perspective of creativity emphasises that individual creativity emerges from the interaction between personal capabilities and contextual conditions. Even when leaders demonstrate creativity-supportive behaviours, the broader organisational climate may either reinforce or constrain their effectiveness.

Research in educational management indicates that supportive organisational climates, characterised by trust, collaboration, and recognition, enhance teachers' willingness to engage in creative behaviours, whereas restrictive climates suppress innovation [5, 8]. Although this moderating role has been examined in other educational contexts, its application to preschool settings remains underexplored. Given the collaborative and emotionally intensive nature of early childhood education, organisational climate is expected to be particularly influential in shaping how leadership affects teachers' creativity.

H5: Organisational climate positively moderates the relationship between creative leadership competencies and teachers' creativity.

F. Moderated Mediation of Organisational Climate

Building on the preceding arguments, it is further proposed that organisational climate not only moderates the direct relationship between creative leadership and teachers' creativity but also conditions the indirect effect of leadership on performance through creativity. From a contingency perspective, leadership effectiveness depends on alignment between leader behaviours and contextual conditions [17]. In supportive climates, creative leadership is more likely to translate into greater creativity, which, in turn, leads to higher performance.

Despite growing theoretical interest in conditional process models, empirical evidence of moderated mediation in early childhood education remains scarce. Addressing this gap, the present study proposes a moderated mediation framework in which organisational climate strengthens the indirect pathway from creative leadership competencies to preschool teachers' performance through teachers' creativity.

H6: Organisational climate moderates the indirect effect of creative leadership competencies on preschool teachers' performance through teachers' creativity.

Based on the above literature, this study proposes a model of a moderated-mediation relationship (Fig. 1). In the current research framework, creative leadership competencies have direct and indirect effects on preschool teachers' performance through Teacher's Creativity (mediation). The strength of these relationships is dependent on the level of organisational climate (moderation). This model incorporates leadership, creativity, and contextual factors to understand when and how creative leadership drives educational innovation and performance in preschool settings.

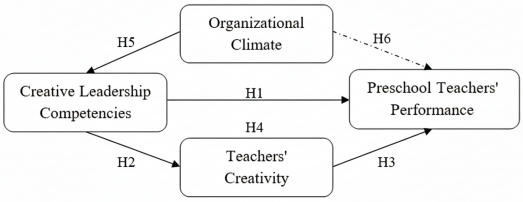

Fig. 1. Conceptual framework of the study.

III. Materials and Methods

A. Research Design

The present study employed a quantitative, cross-sectional, correlational research design to examine the complex relationships among creative leadership competencies, the TC, organisational climate, and preschool teachers' performance in Hebei Province, China. This area was chosen for its representative balance of urban and semi-urban preschool institutions and for the active implementation of the National Preschool Education Action Plan (2021–2025), which focuses on teacher innovation, professionalisation, and school leadership development.

Two complementary modelling approaches were employed in this study: Partial Least Squares Structural Equation Modelling (PLS-SEM) using SmartPLS for the validation of measurement and structural models, and Hayes' PROCESS Macro (Model 7) in SPSS for cross-verification of moderation and mediation effects using bias-corrected bootstrapping. The combination of PLS-SEM and PROCESS provides a multi-method triangulation strategy that enhances the accuracy and validity of results by examining the same theoretical model from both variance-based (PLS-SEM) and regression-based (PROCESS) perspectives [18, 19].

B. Participants and Sampling

The target population comprised preschool teachers working in both public and private kindergartens in Hebei Province, China. Hebei was selected for its educational diversity and strategic relevance to China's preschool reform agenda, encompassing both metropolitan cities and semi-rural areas where preschool expansion is currently strong. A stratified random sampling strategy was employed to ensure that all institutional types (public/private), geographic areas (urban/suburban/rural), and teacher experience levels were represented.

A total of 520 samples were distributed via online and paper-based surveys. After removing low-quality and invalid responses, 412 valid questionnaires remained for analysis, representing 79.2% of the effective response rate. This final sample size meets the statistical power requirements for both PLS-SEM and PROCESS Macro analyses [18]. To further assess sample adequacy, established guidelines for variance-based structural equation modelling were considered. According to the "10-times rule" and more recent recommendations for PLS-SEM, the minimum sample size should be at least ten times the maximum number of structural paths directed at any endogenous construct [18, 19]. In the present model, the largest number of predictors pointing to a single construct is two (CLC and OC predicting TC), indicating that the required minimum sample size is substantially lower than the sample size obtained (412). Therefore, the sample size is sufficient to ensure stable estimation of direct, mediating, and moderating effects.

The respondents' demographic characteristics were consistent with those of the preschool teacher population in Hebei. Approximately 92% of participants were female, consistent with national gender trends in ECE. The participants' ages ranged from 22 to 50 years (M = 33.7, SD = 5.9), with an average teaching lifespan of 6.8 years. In terms of educational qualifications, 64% had a bachelor's degree or more, 29% had a diploma, and 7% had a postgraduate qualification. Participants were selected from preschools in Shijiazhuang, Tangshan, Baoding, Handan, Zhangjiakou, and Qinhuangdao, which represent a broad cross-section of the preschool landscape in Hebei. Although the samples were confined to one province, the stratified design and coverage across multiple cities enhance the sample's representativeness within the Hebei preschool context. This sampling framework ensured that the results represent the regional educational ecosystem and balance developed and developing preschool environments.

C. Instrumentation and Measurement

All constructs were measured using established multi-item scales modified from previously validated studies. Items were rated using a seven-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree). The details were provided in the following list.

1) Creative Leadership Competencies (CLC)

Using eight items adapted from Khalili [20], which measured the abilities of leaders in fostering creativity, in dealing with change, and in encouraging collaboration ("My principal encourages new ideas and experimentation to improve teaching quality").

2) Teachers' Creativity (TC)

Measured through six items drawn from Soh [21], paying attention to innovative teaching practices, idea generation, and problem-solving (e.g., "I often create new things to make learning more fun and effective for children").

3) Organisational Climate (OC)

Measured according to seven items adapted from Thumin *et al*. [22] Team Climate Inventory and modified for preschool contexts [5]. Example item: "Our kindergarten promotes collaboration and sharing of creative teaching concepts". Although organisational climate can be conceptualised as multidimensional (psychological safety, trust, collaboration), the present study operationalised OC as a composite construct reflecting teachers' overall shared perception of the institutional environment. This approach aligns with prior research treating organisational climate as a global contextual indicator in leadership-performance models. Given the study's focus on moderated mediation and model parsimony, a composite operationalisation was considered theoretically appropriate and analytically efficient.

4) Performance of the Preschool Teachers (PTP)

Measured by seven items based on Ref. [23], Measuring Teaching Effectiveness: Classroom Management, Teamwork, Innovation in Practice, "I successfully use creative teaching strategies to improve the learning outcomes of children".

To ensure the cultural appropriateness for the Chinese preschool context, all instruments were carefully reviewed by education experts and refined based on pilot feedback. A pilot study with 30 preschool teachers in Shijiazhuang provided evidence of clarity and reliability for all constructs (Cronbach's alpha >0.80). Expert feedback from three education researchers also ensured that the scale was contextually relevant to Chinese ECE.

All instruments were adapted to fit the preschool context in

China. Minor wording modifications were made to ensure contextual relevance and linguistic clarity while preserving the original construct meaning. For example, items originally referring to "school leaders" were adjusted to "preschool principals," and references to "students" were revised to "children". A pilot test involving 30 preschool teachers was conducted to assess clarity and comprehension, and feedback was used to refine item wording. In addition, three experts in educational leadership reviewed the adapted instruments to ensure content and contextual validity.

D. Data Collection

Data were collected through online and offline methods. Online surveys were distributed to preschools in the main cities of Hebei Province via a Chinese academic platform. Paper-based questionnaires were distributed through local education bureaus at rural and suburban preschools with limited internet access. Data cleaning revealed 108 incomplete or invalid responses, which were removed, leaving 412 usable cases. Normality checks revealed acceptable skewness and kurtosis values of ±2, and multicollinearity checks (VIF < 3.0) showed no redundancy among predictor variables.

To mitigate potential common-method bias, several procedural remedies were implemented. Anonymity and confidentiality were assured to minimise social desirability bias. Items were carefully worded to reduce ambiguity, and construct measures were drawn from established, validated scales. Furthermore, predictor and criterion constructs were placed in separate sections of the questionnaire to reduce evaluation apprehension and pattern responding.

E. Common Method Bias

Given the cross-sectional, self-reported nature of the data, potential Common-Method Bias (CMB) was assessed. Harman's single-factor test was conducted using unrotated exploratory factor analysis. The results showed that the first factor accounted for 37.34% of the total variance, which is below the recommended threshold of 50%, suggesting that CMB is unlikely to pose a serious threat to the validity of the findings. While Harman's single-factor test serves as a preliminary diagnostic, additional safeguards were considered. The use of PLS-SEM with latent constructs, bootstrapping procedures, and discriminant validity testing (including HTMT inference) further reduces concerns regarding common method variance. Together with procedural remedies implemented during data collection, these approaches help mitigate the potential impact of common method bias. Additionally, procedural remedies were applied during survey administration, including assurances of anonymity, neutral item wording, and psychological separation of predictor and criterion variables, further mitigating the risk of common method bias.

F. Data Analysis

1) Partial Least Squares Structural Equation Modelling (PLS-SEM)

PLS-SEM was performed in SmartPLS to test the measurement and structural models. Reliability and validity measures (Cronbach's alpha, Composite Reliability (CR), Average Variance Extracted (AVE)) were used to test research reliability and validity. Structural relationships between constructs were tested using bootstrap (5000 samples) to estimate beta coefficients, *t*-values, and *p*-values. Model fit indices, such as SRMR, R^2, Q^2, and F^2, were reported to determine predictive accuracy [18].

2) PROCESS Macro (Model 7) model for moderated mediation

To validate and cross-check the PLS-SEM results, the PROCESS Macro (Model 7) was utilised with bootstrapping (5000 resamples) [19]. PROCESS allows estimation of conditional indirect effects to test whether the indirect impact of CLC on PTP through TC differs across levels of OC. This dual-modelling approach guarantees analytical triangulation. PLS-SEM offers powerful latent-variable estimation, combined with overall model validation. PROCESS validates the moderated mediation mechanism at the observed-variable level, thereby strengthening the results, improving consistency, and enhancing the theoretical validity of this study.

G. Ethical Statement

This study was reviewed and approved by the Hengshui University Research Ethics Board (HUREB) and conducted in accordance with the ethical principles outlined in the Declaration of Helsinki 1964. Participation was voluntary, and respondents were informed of the study's purpose before completing the questionnaire. Because the survey was anonymous and posed minimal risk, the ethics committee waived the requirement for written informed consent. To ensure data security and confidentiality, no personally identifiable information was collected. Online responses were recorded through password-protected academic survey platforms, and electronic datasets were stored in encrypted files accessible only to the principal investigator. Paper-based questionnaires were securely stored in locked cabinets before digitisation and subsequently destroyed after data entry. Access to the dataset was restricted to the research team, and the data were used solely for academic research. These safeguards ensured compliance with institutional data protection standards and protected participant confidentiality throughout the research process.

IV. Result and Discussion

A. Preliminary Data Screening

Data of 412 preschool teachers from Hebei Province, China were analysed with the Statistical Package of Statistics (SPSS) and SmartPLS. Data screening revealed no missing values or inconsistent responses. Multicollinearity diagnostics showed Variance Inflation Factor (VIF) values ranging from 1.21 to 2.48, indicating no multicollinearity concerns. Skewness values ranged from −0.87 to 0.94, and kurtosis values ranged from −1.55 to 1.73, suggesting acceptable distributional properties for PLS-SEM analysis.

B. Measurement Model Evaluation

The measurement model was originally assessed for construct reliability and validity. As shown in Table 1, all constructs had acceptable internal consistency (Cronbach's alpha > 0.70, CR > 0.80), and convergent validity (AVE > 0.50). Discriminant validity was supported by both

the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (HTMT), with all HTMT values below 0.85, indicating satisfactory construct distinctiveness. All individual indicators showed significant standardised loadings (>0.70), indicating reliability in measuring these items. Bootstrapped HTMT inference (5000 resamples) indicated that the upper bounds of the 95% confidence intervals for all construct pairs were below the threshold of 1.0, providing additional support for discriminant validity.

Table 1. Reliability and validity of constructs

Construct	Cronbach's α	CR	AVE	√AVE	HTMT (Max)
CLC	0.927	0.939	0.714	0.845	0.784
TC	0.894	0.915	0.686	0.828	0.743
OC	0.864	0.897	0.602	0.776	0.751
PTP	0.933	0.944	0.706	0.840	0.782

Notes: AVE: Average Variance Extracted, CLC: Creative Leadership Competencies, CR: Composite Reliability, HTMT: Heterotrait-Monotrait ratio, OC: Organisational Climate, PTP: Preschool Teachers' Performance, TC: Teachers' Creativity

C. Structural Model Evaluation (PLS-SEM)

The structural model was tested using bootstrapping (5000 samples) to estimate path coefficients (β), Standard Errors (SE), *t*-values, and *p*-values. The goodness-of-fit of the overall model and its explanatory power were satisfactory. The Standardised Root Mean Square Residual (SRMR = 0.056) was below 0.08. In addition to SRMR, the Normed Fit Index (NFI) was examined to provide further evidence of global model fit. The NFI value of 0.91 exceeds the recommended threshold of 0.90, indicating satisfactory model fit within the variance-based PLS-SEM framework. Although covariance-based indices such as χ^2 are commonly reported in CB-SEM, PLS-SEM primarily emphasises predictive accuracy (R^2, Q^2) and model fit through SRMR. Therefore, SRMR and NFI were considered appropriate global indicators for evaluating the structural model in the present study.

The result of R-squared (R^2) of Teacher's Creativity (TC) was 0.492, whereas R^2 of Preschool Teacher's Performance (PTP) was 0.603. Furthermore, Q^2 values were above zero for all the endogenous constructs.

D. Hypothesis Testing (PLS-SEM)

The results of hypothesis testing based on the PLS-SEM are illustrated in Table 2. Specifically, Creative Leadership Competencies (CLC) significantly influenced Teachers' Creativity (TC) (β = 0.563, p < 0.001) and Preschool Teachers' Performance (PTP) (β = 0.231, p < 0.001), both with a significant positive impact, supporting H1 and H2. In turn, TC was also significantly related to PTP (β = 0.406, p < 0.001), supporting H3.

The indirect effect (CLC --> TC --> PTP) was significant (β = 0.228, p < 0.001), supporting the mediating hypothesis H4. To further clarify the nature of mediation, the variance accounted for (VAF) was calculated. The indirect effect (β = 0.228) relative to the total effect (β = 0.459, calculated as the sum of the direct and indirect effects) yielded a VAF of approximately 49.7%, indicating partial mediation. This suggests that creative leadership competencies influence preschool teachers' performance both directly and indirectly through teachers' creativity. In addition, the interaction effect between CLC and Organisational Climate (OC) on TC was significant (β = 0.114, p = 0.007), supporting H5. The moderated-mediation index (β = 0.078, p = 0.012) further confirms that the strength of the indirect relationship between leadership and performance via creativity depends on the perceived organisational climate.

Beyond statistical significance, the magnitude of the path coefficients was evaluated to assess practical relevance. Following established guidelines, standardised coefficients are considered small at around 0.10, moderate at 0.30, and large at 0.50. The effect of CLC on TC (β = 0.563) is large, indicating a strong practical influence of creative leadership on teachers' creativity. The effect of TC on PTP (β = 0.406) represents a moderate-to-large effect, while the direct effect of CLC on PTP (β = 0.231) reflects a small-to-moderate contribution. Furthermore, the R^2 value for TC (0.492) indicates moderate explanatory power, and the R^2 for PTP (0.603) suggests moderate-to-substantial explanatory strength in the educational context. These findings demonstrate not only statistical significance but also meaningful practical relevance.

Table 2. Structural model results (PLS-SEM)

Hypo	Path	β	SE	*t*-value	*p*-value	*R*
H1	CLC→PTP	0.231	0.057	4.05	<0.001	√
H2	CLC→TC	0.563	0.048	11.73	<0.001	√
H3	TC→PTP	0.406	0.060	6.77	<0.001	√
H4	CLC→TC→PTP (Indirect)	0.228	-	-	<0.001	√
H5	CLC × OC→TC (Moderation)	0.114	0.042	2.71	0.007	√
H6	CLC × OC→TC→PTP (Moderated-mediation)	0.078	-	-	0.012	√

Notes: β = standardized path coefficient; p < 0.05 = significant; CLC: Creative leadership competencies; OC: Organizational climate; PTP: Preschool teachers' performance; TC: teachers' creativity; *R*: result.

E. Moderated Mediation Analysis (PROCESS Macro)

To cross-validate the PLS-SEM moderated-mediation findings, Hayes' PROCESS Macro (Model 7) was executed using 5000 bias-corrected bootstrap samples [19]. The PROCESS analysis used the observed composite scores (mean item scores) for Creative Leadership Competencies (CLC), Teachers' Creativity (TC), Organisational Climate (OC), and Preschool Teachers' Performance (PTP). The indirect effect of CLC on PTP via TC varied across levels of Organisational Climate. The index of moderated mediation was 0.071 (95% CI [0.021, 0.125]) and did not include zero, supporting H6.

The moderation effect is formally supported by the statistically significant interaction term and the bootstrapped confidence intervals generated using PROCESS Model 7. While Fig. 2 illustrates the interaction pattern, inferential evidence is based on the significant interaction coefficient and the index of moderated mediation, rather than on graphical inspection alone. The positive interaction coefficient indicates that the influence of creative leadership competencies on teachers' creativity becomes stronger as organisational climate increases, thereby confirming the conditional nature of the relationship. A graphical representation of the interaction effect between CLC and OC on TC is presented in Fig. 2.

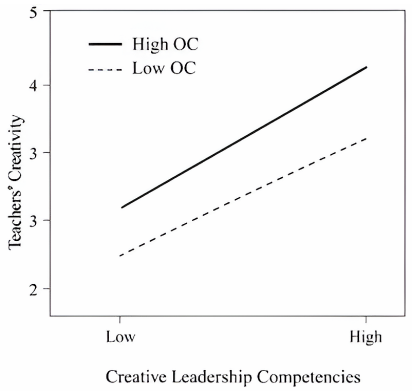

Fig. 2. Moderating effect of organisational climate on the relationship between creative leadership competencies and teachers' creativity.

F. Summary of Hypotheses Testing

A summary of hypothesis tests integrating both PLS-SEM and PROCESS results is presented in Table 3. All proposed hypotheses (H1–H6) were supported. The results were consistent across both PLS-SEM and PROCESS analyses.

Table 3. Summary of hypothesis testing results

Hypo	Statement	Evidence	*p*-value	R
H1	CLC→PTP	$\beta = 0.231$ (PLS-SEM); $\beta = 0.229$ (PROCESS)	<0.001	√
H2	CLC→TC	$\beta = 0.563$ (PLS-SEM)	<0.001	√
H3	TC→PTP	$\beta = 0.406$ (PLS-SEM)	<0.001	√
H4	TC mediates CLC→PTP	Indirect $\beta = 0.228$ (PLS-SEM); $\beta = 0.215$ (PROCESS); 95% CI [0.139,0.308]	<0.001	√
H5	OC moderates CLC→TC	$\beta = 0.114$ (PLS-SEM); $\beta = 0.118$ (PROCESS)	<0.01	√
H6	OC moderates the indirect effect (moderated-mediation)	Index=0.078 (PLS-SEM); Index=0.071 (PROCESS); 95% CI [0.021,0.125]	<0.05	√

Notes: $p < 0.05$ = significant, CLC: Creative Leadership Competencies, CR: Composite Reliability, HTMT: Heterotrait-Monotrait Ratio, OC: Organisational Climate, PTP: Preschool Teachers' Performance, TC: Teachers' Creativity, R: Result.

The present study examines how Creative Leadership Competencies (CLC) influence Preschool Teachers' Performance (PTP) through the mediating role of Teachers' Creativity (TC) and the moderating role of Organisational Climate (OC) using data from 412 preschool teachers in Hebei Province, China. Rather than merely establishing direct leadership-performance relationships, the findings provide a more nuanced explanation of how and under what conditions creative leadership contributes to educational innovation in early childhood settings.

The results indicate that creative leadership competencies are positively associated with preschool teachers' performance. This finding aligns with Transformational Leadership Theory, which emphasises the motivational and developmental role of visionary and supportive leadership behaviours [14]. In early childhood education contexts, creative leaders who encourage experimentation, intellectual stimulation, and problem-solving appear better positioned to support teachers' instructional engagement and professional functioning. Importantly, this study extends prior work by situating creativity-oriented leadership within preschool settings, where instructional autonomy and pedagogical flexibility are particularly salient [24].

Moreover, the findings demonstrate that creative leadership competencies are positively related to teachers' creativity, reinforcing the idea that teaching creativity is not solely an individual attribute but is shaped by leadership behaviours and the broader social environment. This result contributes to Amabile's Componential Theory of Creativity by empirically illustrating how leadership practices may activate intrinsic motivation and creative engagement among teachers. Rather than treating creativity as a fixed outcome, the findings highlight its dynamic nature, shaped by organisational actors and practices.

Teachers' creativity also mediated the relationship between creative leadership competencies and performance. This mediating mechanism suggests that leadership influences teacher performance indirectly by fostering creative engagement, pedagogical confidence, and adaptive instructional practices. In this regard, the study advances leadership and creativity research by moving beyond direct-effect models and clarifying creativity as a key psychological pathway linking leadership to performance outcomes. This perspective is consistent with Self-Determination Theory, which emphasises the role of autonomy and competence in enhancing intrinsic motivation and work effectiveness [16].

The moderating role of organisational climate further refines this explanation. The findings indicate that a supportive organisational climate strengthens the positive relationship between creative leadership and teachers' creativity, as well as the indirect effect on performance. This supports interactionist and contingency perspectives in organisational behaviour, which argue that leadership effectiveness depends on alignment between leader behaviours and contextual conditions [17]. In preschool environments characterised by trust, collaboration, and shared vision, creative leadership appears more likely to translate into creative teaching practices. Conversely, rigid or unsupportive climates may constrain the expression of creativity, even when leadership competencies are present.

From a theoretical standpoint, this study contributes to the literature in several ways. It extends creative leadership research into the underexplored domain of early childhood education, empirically validates teachers' creativity as a mediating mechanism, and incorporates organisational climate as a meaningful boundary condition [25]. Additionally, by employing both PLS-SEM and PROCESS Macro analyses, the study strengthens methodological robustness and demonstrates consistency across variance-based and regression-based approaches.

In addition to these contributions, the present study is differentiated from related regional research in several important respects. While prior studies in China and neighbouring contexts have often examined general leadership styles (e.g., transformational or distributed leadership) and their direct associations with teacher outcomes, relatively few have focused specifically on creative leadership competencies in preschool settings [26]. Moreover, existing regional studies typically emphasise direct-effect models, whereas the current research advances a conditional process framework by testing teachers' creativity

as a mediating mechanism and organisational climate as a contextual moderator. The dual application of PLS-SEM and PROCESS Macro further strengthens methodological rigour and distinguishes this study from single-method investigations. These distinctions clarify the theoretical and empirical novelty of the present research within the regional literature (Table A1).

Practically, the findings suggest that efforts to improve preschool teachers' performance should focus not only on developing leadership competencies but also on cultivating supportive organisational climates. Leadership training programs may benefit from emphasising behaviours oriented towards creativity, while institutional policies should promote collaboration, psychological safety, and openness to innovation. In the Chinese preschool context, where rapid educational reform is underway, aligning leadership development with organisational culture may be particularly important for sustaining pedagogical innovation [27].

These findings are particularly relevant within the framework of China's Education Modernisation 2035 and the National Preschool Education Action Plan (2021–2025), both of which emphasise quality enhancement, teacher professionalisation, and leadership capacity-building in early childhood institutions. Current regulatory mandates encourage preschool administrators to move beyond administrative supervision toward instructional and innovation-oriented leadership roles [28]. The present findings provide empirical support for this policy direction by demonstrating that creativity-oriented leadership competencies, when embedded within supportive organisational climates, are associated with improved teacher performance [29]. Thus, the study offers evidence-based insights aligned with national reform priorities in preschool governance and leadership development.

Although the present findings and speculations are comprehensive, they are not without limitations. The cross-sectional design restricts causal inference, and the reliance on self-reported data may introduce response bias. Although procedural and statistical remedies were applied, residual common method variance cannot be entirely ruled out. Future research may employ temporal separation of measurement or marker-variable techniques (CFA marker approach) to further mitigate this concern [30, 31]. Future research could adopt longitudinal or multi-source designs to further validate the proposed relationships. Additionally, as the study was conducted in Hebei Province, caution is warranted in generalising the findings to other regions or educational systems. Future studies could explore cross-regional or cross-cultural comparisons and examine additional psychological and contextual variables to further clarify leadership—creativity dynamics. Additionally, future research may examine specific subdimensions of organisational climate (psychological safety, trust, or collaborative culture) to explore whether distinct climate components exert differential moderating effects.

V. Conclusion

The present study examined how creative leadership competencies influence preschool teachers' performance, with creativity as a mediating variable and organisational climate as a moderating variable, using data collected from 412 preschool teachers in Hebei Province, China, and employing both PLS-SEM and PROCESS Model 7 analyses. The findings demonstrate that creative leadership competencies positively influence teacher performance both directly and indirectly through teachers' creativity. Furthermore, a supportive organisational climate strengthens the positive relationship between leadership competencies and teachers' creativity, highlighting the importance of contextual conditions in translating leadership practices into improved educational outcomes.

These findings contribute to leadership and creativity research by clarifying the psychological and contextual mechanisms through which leadership competencies shape teacher performance in early childhood education. From a practical perspective, the results suggest that leadership development initiatives in preschools should emphasise creativity-oriented competencies and foster supportive organisational climates that encourage experimentation, collaboration, and pedagogical innovation. However, this study is subject to certain limitations. The cross-sectional design limits causal inference, and reliance on self-reported data may introduce response bias. Also, the sample was limited to preschools in Hebei Province, which may affect the generalisability of the findings. Future research should employ longitudinal or multi-source designs and explore cross-regional contexts to further validate and extend the proposed model.

Appendix

A. Sample Adapted Measurement Items

1) Creative Leadership Competencies (CLC)

Example item: "My preschool principal encourages new ideas and experimentation to improve teaching quality".

2) Teachers' Creativity (TC)

Example item: "I frequently develop innovative activities to enhance children's learning experiences".

3) Organizational Climate (OC)

Example item: "Our kindergarten promotes collaboration and open sharing of teaching ideas".

4) Preschool Teachers' Performance (PTP)

Example item: "I effectively apply creative teaching strategies to improve children's engagement".

B. Comparative Literature Map

Table A1. Comparative literature map

Context & Sample	Key Constructs	Analytical Approach	Core Findings	Distinction from Present Study
Primary/K–12 schools	Leadership style → Teacher outcomes	CB-SEM / Regression	Significant direct leadership-performance link	Focused on general leadership style; no mediation or moderation tested
Secondary education	Transformational leadership → Innovation	SEM	Leadership positively predicts innovation	Did not examine preschool context; no conditional process modeling
Educational institutions	Leadership → Organizational climate	Regression	Climate mediates leadership effects	Did not examine teachers' creativity as mediator

Kindergarten teachers	Leadership → Job satisfaction	Regression	Positive association found	No moderated mediation framework; no dual-method validation
Preschool teachers, Hebei Province, China; $n = 412$	Creative leadership competencies; Teachers' creativity (mediator); Organizational climate (moderator); Teacher performance	PLS-SEM + PROCESS Model 7 (bootstrapping)	CLC → TC ($\beta = 0.563$); TC → PTP ($\beta = 0.406$); moderated mediation significant	Focus on preschool sector; explicit mediating mechanism; OC as boundary condition; dual-method triangulation; conditional process framework

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

Li conducted the research; Loy analyzed the data; Li and Loy wrote the paper; Li revised and edited the paper; All authors had approved the final version.

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