Research Article

Perceived Principal's Instructional Leadership and Creative Teaching Behaviors: The Mediating Role of Knowledge Sharing Among University Teachers in Jiangsu of China

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ABSTRACT

This study investigates how teachers' perceived instructional leadership of university presidents influences their creative teaching behaviors in Jiangsu, China, and examines the mediating role of knowledge sharing. Drawing on social exchange theory, this current study surveyed 770 teachers from four universities in Jiangsu; 738 valid responses were returned, yielding a 95.84% response rate. Results indicate that teachers' creative teaching behaviors differ significantly by gender, years of teaching experience, and highest degree earned; perceived instructional leadership exerts a significant positive effect on creative teaching behaviors; and teachers' knowledge sharing is positively related to creative teaching behaviors. Crucially, knowledge sharing serves as a full mediator in this relationship. Furthermore, teachers' psychological factors (such as intrinsic motivation and emotional state) play a key role in creative teaching behavior. Moreover, teachers' psychological factors (e.g., intrinsic motivation, emotional state) are identified as key antecedents influencing these mediated pathways.

Keywords: University teachers; principal instructional leadership; knowledge sharing; teacher creative teaching behavior; teacher motivation; emotional state; psychological factors

1. Introduction

Universities play a vital role in cultivating high-quality, innovative talents, which necessitates close alignment between educational objectives and societal innovation trajectories [1]. Teachers, as the cornerstone of educational quality and excellence, are pivotal in this process [2]. Creative teaching behavior is crucial for enhancing instructional quality, improving learning outcomes, and driving educational reform [3]. In the modern educational landscape, this often involves the integration of technology, requiring educators to develop expertise in Technological Pedagogical Content Knowledge (TPACK) to effectively implement innovative strategies [4]. However, university students' unique psychological characteristics add complexity to teaching, requiring educators to possess creative literacy and adopt innovative strategies [5,6].

As the primary platform for talent development, classroom teaching is crucial for fulfilling the fundamental mission of fostering virtue through education. University teachers must therefore strengthen classroom management and improve instructional quality by dedicating time and effort to conscientiously

deliver each lesson [7]. However, influenced by traditional educational paradigms, many university instructors in mainland China remain resistant to adopting creative teaching behaviors [8]. While existing research has explored teachers' psychological capital (e.g., self-efficacy, optimism) as a mediator between institutional support and innovation [9,10], few studies have examined these mechanisms in the context of higher education, particularly in China.

Within educational institutions, leadership is a key factor influencing innovation [11]. One of the defining characteristics of school innovation is that it is not only manifested through teachers' innovative behaviors but also facilitated by leadership, which creates an environment conducive to innovation [12]. Therefore, school leaders must enhance their managerial and leadership capabilities to support the development of innovative behaviors among teachers [13]. Principals play a critical role in driving teaching reforms and the overall development of schools, serving as indispensable agents of change [14]. Among various leadership styles, instructional leadership has been shown to have a stronger impact on student achievement than other forms of leadership [15]. Perceived principal instructional leadership refers to teachers' subjective evaluations of a principal's capabilities and actions in areas such as setting instructional goals, providing teaching resources, and supporting teachers' professional development [16].When teachers perceive that their principals support and recognize their work, they are more likely to proactively experiment with innovative teaching methods. They may also improve curriculum design to meet the diverse needs of students and adapt to the evolving educational landscape [17]. A review of the existing literature reveals that while there is a wealth of research on principal instructional leadership at the compulsory education level both in China and abroad, related studies in the context of higher education remain limited [18]. Therefore, this study focuses on university settings, exploring principal instructional leadership from the perspective of teachers' perceptions. It aims to extend and deepen the applicability and explanatory power of the instructional leadership concept across different educational contexts, thereby offering theoretical insights and practical guidance for educational reform and innovation in higher education institutions. Notably, the effectiveness of instructional leadership depends on teachers' psychological ownership—that is, their personal commitment to curriculum decisions [19]. When leadership behaviors foster a climate that supports autonomy [20], teachers exhibit greater intrinsic motivation to try new teaching methods.

In the context of modern education, knowledge sharing is an indispensable component of higher education institutions [21]. Knowledge sharing serves as a critical mechanism for enhancing teachers' innovative capacities and organizational learning [22,23]. According to Social Exchange Theory, teachers reciprocate institutional support through knowledge sharing, which in turn fosters creative teaching [24,25]. Moreover, there is a significant positive correlation between knowledge sharing behavior and teachers' creative teaching behavior. Knowledge sharing enhances teachers' innovation capacity, helps them develop new teaching methods and strategies, and increases their receptiveness to new knowledge [26]. When schools provide an open and supportive environment for knowledge sharing, teachers' innovative behaviors are significantly strengthened [27].

Equally important is the ecosystem surrounding university faculty [28]. The job demands-resources model [29] illustrates how excessive administrative burdens can deplete faculty's cognitive resources for innovation, while colleague support and adequate technological infrastructure can serve as motivational resources. Recent neuroeducational research further suggests that positive affective states can broaden faculty attention [30], fostering the cognitive connections necessary for creative course design.

This study focuses on Jiangsu Province, a region exemplifying China's educational modernization efforts. Jiangsu boasts a robust higher education system, with 168 institutions, including 15 "Double First-

Class" universities and 688 nationally recognized undergraduate programs [31–33]. These features make Jiangsu an ideal context for examining creative teaching behaviors, offering both representativeness and exemplarity for similar regions in China.

In summary, while creative teaching behavior is a well-recognized indicator of educational innovation, most studies focus on K–12 settings, leaving a gap in higher education research [34,35]. Thus, this study takes university teachers in Jiangsu Province as the research subjects and investigates the mechanisms influencing their creative teaching behaviors from a multifaceted perspective, including perceived principal instructional leadership, knowledge sharing, and organizational innovation climate. The findings aim to provide both theoretical support and practical guidance to enhance university teachers' capacity for instructional innovation.

2. Literature review

2.1. Social exchange theory

Social Exchange Theory (SET), which emerged in the 1960s, was systematically developed through the works of scholars such as Homans [24], Blau [36], Thibaut and Kelley [37], and Emerson [38]. SET is founded on the premise that interpersonal relationships are based on a process of exchange. When subordinates receive support and tolerance from their leaders, they are more likely to reciprocate with greater work effort and improved performance.

This theory centers on the concept of logical balance, emphasizing the cost–benefit dynamics within social interactions. It particularly focuses on how exchanges within organizations involve both tangible or "hard" rewards—such as monetary incentives and promotions—and intangible or "soft" returns, such as reputation and emotional support [39,40]. At the heart of SET lies the norm of reciprocity: individuals act voluntarily with an expectation of return, and beneficiaries of support often feel obligated to reciprocate. This dynamic equilibrium significantly impacts the maintenance or dissolution of social relationships [41,42]. Teachers' reciprocal behaviors are mediated by two psychological mechanisms: Cognitive evaluation of the value of the resource (e.g., whether the professional development opportunity aligns with the educator's self-concept). Affective trust in the leader's benevolence [43]. These mechanisms explain why identical leadership behaviors may elicit varied teacher responses in different institutional settings.

Recent advances in SET emphasize the role of psychological processes in exchange relationships. The affect theory of social exchange [44] posits that positive emotional responses to exchange interactions strengthen relationship bonds and commitment. In education, when teachers perceive their principal's support as genuine and emotionally charged, they are more likely to reciprocate through discretionary efforts, such as creative teaching [45]. A recent meta-analysis further confirms that high-quality social exchange relationships significantly promote employee innovation within teams [46], bolstering the applicability of SET in explaining teachers' innovative behaviors. For instance, Blau [36] pointed out that in high-quality social exchanges, individuals demand less immediate return, and sustained reciprocal interactions—rooted in interpersonal trust and emotional identification—can enhance employees' sense of organizational belonging [47]. Research further indicates that in higher education institutions, school leadership is a significant predictor of various organizational outcomes [48], and the quality of teaching is notably influenced by school administrators' leadership [49].

In the present study, SET serves as the theoretical framework for analyzing the mechanisms influencing university teachers' creative teaching behaviors. In the context of Chinese higher education, SET requires cultural contextualization. The norm of "human feelings" in Confucian society amplifies the emotional

dimension of reciprocity [50] , making teachers more sensitive to symbolic gestures from principals (such as public recognition) rather than contractual rewards. This cultural perspective enriches the application of SET as a theoretical framework. Recent studies in higher education have further validated SET's explanatory power in similar contexts. For instance, research by Khan et al. demonstrated that leadership styles based on social exchange significantly predict innovative work behavior in university settings, underscoring the theory's relevance beyond compulsory education [48]. Similarly, Yalçınkaya et al. found that principals' leadership behaviors directly impact teacher motivation through mechanisms of reciprocity, which aligns with the core tenets of SET applied in this study [49].

Within the context of universities in Jiangsu Province, the interaction between principals and teachers exemplifies a typical exchange relationship. When principals provide instructional support and developmental opportunities that align with teachers' expectations, teachers are likely to reciprocate by increasing their teaching engagement—for example, by adopting innovative instructional strategies—thus forming a positive cycle of "resource support–creative behavior"[51,52]. Knowledge sharing acts as a key mediating variable in this exchange process. It functions both as a form of reciprocal behavior by teachers in response to instructional leadership, and as a vital pathway through which trust and collaboration enhance creative teaching [39]. From a psychological perspective, knowledge sharing has a dual function: resource exchange (instrumental) and trust cultivation (affective), and neural evidence suggests that it has intrinsic reward value [53].

In summary, Social Exchange Theory provides a robust conceptual framework for this study, offering insights into the formation mechanisms of university teachers' creative teaching behaviors. By examining the interrelationships among perceived principal instructional leadership, knowledge sharing, and creative teaching behaviors, this research aims to uncover the key factors and processes that influence teachers' instructional innovation.

2.2. Teachers' creative teaching behavior

Lin Chongde and Yu Guoliang [54] defined creative teaching as an instructional process guided by the fundamental principles of creativity studies, creative psychology, and creative pedagogy. It involves the application of scientific teaching methods and approaches to simultaneously impart knowledge, develop intelligence, and cultivate creativity. This process is jointly constituted by teachers teaching creatively and students learning creatively. Lin [55] further clarified that teachers' creative teaching behavior refers to a behavioral process in which teachers adopt creative instructional methods with the aim of fostering students' innovative qualities. Jin Tao and Wu Tiansheng [56] offered a similar perspective, emphasizing that creative teaching behavior consists of a teaching process shaped by the creative engagement of both teachers and students, all directed toward achieving educational goals. Yao Jie et al. [57] also argued that creative teaching behavior is a key factor influencing students' innovative capacity. Under the influence of new educational philosophies, teachers continuously reform teaching content and update instructional methods to offer students new perspectives and learning opportunities. Contemporary scholarship further conceptualizes creative teaching behavior as a dynamic interplay between cognitive flexibility (the ability to generate alternative teaching solutions) and affective engagement (emotional commitment to innovative practices). This dual-process perspective aligns with the cognitive-affective systems theory of creativity [58], which emphasizes how teachers' creative outputs emerge from the interplay between domain-specific skills and intrinsic motivation.

Existing research on creative teaching behavior consistently indicates the presence of gender differences. For instance, Yang Ze [59] found that male and female teachers differ in how they cultivate students'

competencies, with male teachers demonstrating more flexible and varied teaching methods. Other studies also point out that male teachers outperform female teachers in areas such as openness to experience, diversity in instructional materials and methods, innovation in handling classroom tasks, and flexibility in solving teaching-related problems. However, female teachers tend to excel in aspects such as enthusiasm for teaching, approachability, assessment of innovative teaching outcomes, and students' sense of learning achievement, suggesting that teachers of different genders have distinct strengths in creative teaching [60]. These gender differences may stem from different psychological tendencies: male teachers tend to be more risk-averse in teaching experiments [61], while female teachers are more emotionally attuned and better able to understand students' needs [62]. This difference suggests that creative teaching manifests differently across genders, rather than having an absolute advantage for one group. While these studies offer foundational insights, recent research specifically within higher education provides a more contextualized understanding. Brauer, Ormiston, & Beausaert, in a systematic review of creativity-fostering behaviors in higher education, emphasized the role of academic autonomy and intellectual stimulation—factors distinct to the university environment [35]. Their work shifts the focus from general teacher creativity to domain-specific innovative practices in academia. Furthermore, studies indicate that in universities, creative teaching is often driven by research integration and knowledge co-creation with students, a dimension less prominent in compulsory education [35].

Regarding teaching experience, Quan Yuetong [63] found significant differences across various dimensions of creative teaching behavior depending on years of service. Teachers with 6–15 years of experience performed better than those with 1–5 or 16–25 years of experience. Hou Haoxiang [12] reported that teachers with over 21 years of experience demonstrated the lowest levels of creative teaching behavior among all groups. In a study by Chu Yuxia [64], multiple comparisons showed that in the dimension of motivation for creativity, teachers with 1–5 years of experience scored higher than other groups, while those with 6–15 years scored higher than those with over 25 years. However, no significant differences were found in total scores of creative behavior among the various experience groups.

In terms of educational attainment, Zeng Lu et al. [65] found significant differences in the implementation of innovative concepts across teachers with different academic degrees. Specifically, teachers with bachelor's degrees scored significantly lower than those with associate or graduate degrees. Chang Yu et al. [66] revealed that teachers with associate degrees scored higher in creative teaching behaviors than those with bachelor's or graduate degrees, while teachers with bachelor's degrees achieved the highest scores in instructional guidance strategies compared to teachers of other educational levels.

Based on the literature above, this study proposes the following hypotheses:

H1: There are significant differences in creative teaching behaviors among university teachers in Jiangsu Province, China, based on their demographic characteristics (gender, years of teaching experience, and educational attainment).

H1a: There are significant gender differences in creative teaching behaviors among university teachers in Jiangsu Province.

H1b: There are significant differences in creative teaching behaviors among university teachers in Jiangsu Province based on years of teaching experience.

H1c: There are significant differences in creative teaching behaviors among university teachers in Jiangsu Province based on educational attainment.

2.3. The interrelationship among perceived principal instructional leadership, knowledge sharing, and creative teaching behavior

Existing research has shown that principal instructional leadership has a significant impact on teachers' instructional behaviors [67,68]. Schechter [69] found that principal instructional leadership exerts a positive influence on teachers' behavior by motivating and guiding them to adjust their existing practices. This may involve engaging teachers in instructional discussions, facilitating professional dialogue and reflection, and enhancing communication within the teaching community. When teachers feel supported and connected to key individuals—such as leaders, colleagues, and students—they are more likely to engage in innovative practices [70]. Empirical studies have also indicated that university teachers' perceptions of leadership styles can influence their innovative behaviors [71]. Zhang and Bartol [72] emphasized that innovative behavior at every level of an organization, whether direct or indirect, requires leadership support.

Within the school context, perceived principal instructional leadership is a key psychological factor that motivates teachers to engage in knowledge sharing. When teachers perceive supportive leadership from principals—both professionally and personally—they are more confident and willing to share knowledge and resources with colleagues. They are also more likely to actively seek out others' knowledge to achieve instructional goals [73]. Hou Haoxiang [12] found that principals who advocate innovative teaching concepts and model such behavior help foster a school environment conducive to innovation, encouraging teachers to develop habitual creative teaching behaviors, thereby evolving into a teaching organization with a strong culture of innovation. When schools provide comprehensive support for teachers, it not only strengthens teachers' sense of belonging but also motivates them to share their individual teaching knowledge and innovative experiences with peers. Such sharing behavior is a form of positive reciprocity in response to institutional support [74]. In short, perceived principal instructional leadership is an important driver of teachers' knowledge-sharing behaviors.

There is a significant positive relationship between knowledge sharing and teachers' creative teaching behavior. Knowledge sharing enhances teachers' capacity for innovation by helping them develop new instructional methods and strategies and by increasing their receptivity to new knowledge [26]. Crucially, knowledge sharing behavior is underpinned by two psychological antecedents. Psychological safety: Teachers believe they will not be penalized for expressing new ideas [75]. Prosocial motivation: The inherent desire to contribute to collective progress [76]. These mechanisms explain why the same leadership initiatives can produce different knowledge sharing outcomes across different departments. Based on Social Exchange Theory, when teachers perceive strong instructional leadership from principals, they are more inclined to share knowledge and experiences with colleagues. This knowledge-sharing behavior serves not only as a form of reciprocation but also as a key mechanism for building trust and collaboration among teachers. Through the sharing of ideas and resources, teachers gain access to a wider range of instructional inspirations, which in turn fosters creative teaching practices [39]. Knowledge sharing also allows teachers to encounter diverse perspectives and problem-solving approaches, enriching their cognitive frameworks and providing a broader professional knowledge base—essential sources of input for innovation [77]. Furthermore, it exposes teachers to unfamiliar domains and skillsets, enabling them to develop new capabilities and adopt more diverse approaches in both teaching and research [78].

Therefore, effective principal instructional leadership can help create a supportive environment for teachers by offering continuous professional development, setting clear instructional expectations, and fostering a culture of innovation [79]. Some scholars have pointed out that knowledge sharing can be viewed as a critical external contextual factor that strengthens the positive relationship between psychological empowerment and creativity [80]. When teachers feel supported and recognized by their principals, they are

more likely to experiment with innovative teaching methods and revise course designs to meet students' diverse needs and respond to a rapidly changing educational environment [17]. However, few studies have explored the mediating role of knowledge sharing in the relationship between perceived principal instructional leadership and creative teaching behavior. Based on this gap, the following research hypotheses are proposed:

H2: University teachers' perceived principal instructional leadership has a significant positive impact on creative teaching behavior in Jiangsu Province, China.

H3: University teachers' perceived principal instructional leadership has a significant positive impact on knowledge sharing in Jiangsu Province, China.

H4: University teachers' knowledge sharing has a significant positive impact on creative teaching behavior in Jiangsu Province, China.

2.4. Psychological factors and creative teaching behavior

Creative teaching behaviors are not merely responses to external stimuli but are governed by a complex interplay of psychological mechanisms. Grounded in Self-Determination Theory (SDT) [81], this study contends that the satisfaction of teachers' basic psychological needs—autonomy (feeling volitional in teaching), competence (feeling effective in innovating), and relatedness (feeling connected to colleagues and leadership)—is a critical prerequisite for intrinsic motivation to innovate. When instructional leadership supports these needs, it catalyzes more autonomous and creative engagement.

Furthermore, the Conservation of Resources (COR) Theory [10] and the Broaden-and-Build Theory [30] offer complementary lenses. COR suggests that leadership support and knowledge sharing act as valuable resources that help teachers offset the perceived risks of innovation, preventing resource depletion and motivating resource investment into creative endeavors. Conversely, the Broaden-and-Build Theory posits that positive affective states arising from supportive exchanges (e.g., with leaders and peers) broaden teachers' cognitive and behavioral repertoires, building lasting personal resources like resilience and creative self-efficacy [9].

The core mechanism translating these psychological conditions into action is creative self-efficacy—teachers' belief in their capability to innovate. This efficacy mediates the relationship between institutional support and behavioral outcomes, manifesting in: (1) enhanced metacognitive monitoring during course design; (2) greater persistence in overcoming implementation barriers; and (3) greater adaptability in refining methods based on student feedback [82,[83]. Furthermore, teacher self-efficacy not only directly influences innovative behavior but can also indirectly promote creative teaching by mitigating job burnout [84]. These factors, intertwined with leadership and environment, form a dynamic system where high self-efficacy amplifies the benefits of support while buffering constraints.

3. Research methodology

3.1. Research framework

Based on Social Exchange Theory and a comprehensive review of the relevant literature, this study constructs a research framework that integrates the key variables under investigation. In this framework, *perceived principal instructional leadership* is identified as the independent variable, *creative teaching behavior* as the dependent variable, and *knowledge sharing* as the mediating variable. Additionally, *gender*, *years of teaching experience*, and *educational attainment* are included as background (control) variables. The conceptual model of this study is illustrated in Figure 1.
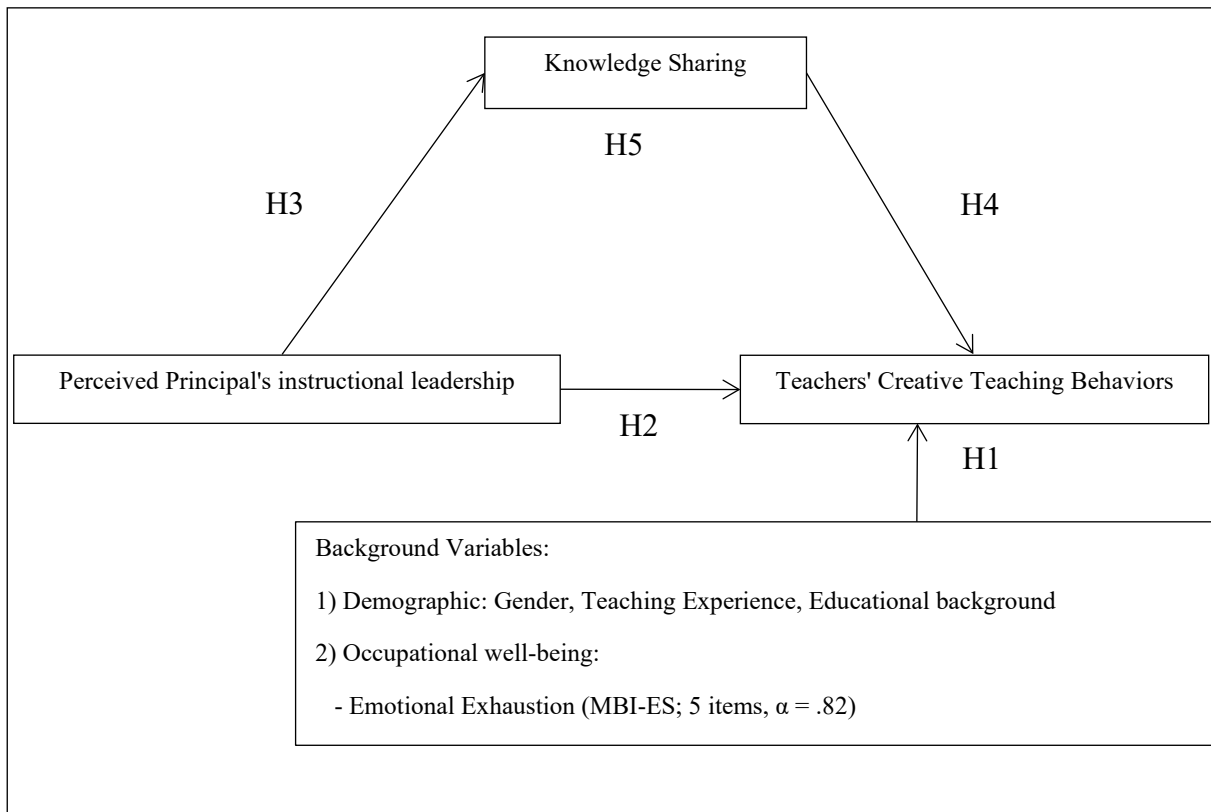
Figure 1. Conceptual framework of the study

Note: This figure illustrates the relationships among the variables in this study. Developed by the authors.

3.2. Research participants

In line with the objectives of this study, the research participants were full-time faculty members at undergraduate universities in Jiangsu Province, selected to provide insights and experiences related to creative teaching. Participants were required to meet the following criteria:

1. they must be formally employed full-time faculty members;

2. they must have been teaching at a university in Jiangsu prior to June 2024; and

3. they must have no criminal record.

All participating teachers were informed of the purpose of the study and the voluntary nature of their participation. All data collected in this study were anonymous to protect the identities of the respondents.

The four universities selected for the survey have long histories and are located in different regions of Jiangsu Province—Southern Jiangsu (Suzhou region), Central Jiangsu, and Northern Jiangsu. All four are well-established second-tier undergraduate institutions within the province and are considered to represent the mid-level teaching quality of Jiangsu's undergraduate universities. Therefore, selecting these four institutions ensures a relatively representative sample for the study. This purposive selection strategy aimed to capture a diverse yet representative snapshot of the provincial higher education landscape. By including institutions from the economically advanced south (Suzhou), the central region, and the developing north, the sample encompasses a variety of regional development contexts. Furthermore, focusing on well-established second-tier universities, which constitute the backbone of Jiangsu's higher education system, enhances the ecological validity of the findings for a significant segment of the target population.

3.3. Sampling method

To ensure a smooth distribution and high response rate of the questionnaire, this study adopted a convenience sampling method. The electronic questionnaire was designed using the Wenjuanxing (Questionnaire Star) platform and distributed via various digital channels such as email, QQ, and WeChat, along with a participation invitation and survey link.

A total of 770 questionnaires were distributed. After excluding 32 invalid responses, 738 valid questionnaires were collected, resulting in a response rate of 95.84%.

While convenience sampling facilitated efficient data collection and yielded a high response rate, it acknowledges limitations regarding the generalizability of the findings. The sample may not fully represent all tiers of universities (e.g., top-tier "Double First-Class" or vocational colleges) within Jiangsu Province. Future research could employ stratified random sampling techniques to include faculty from a broader spectrum of institutions, thereby enhancing the external validity and robustness of the results.

3.4. Research instruments

(1) Perceived Principal Instructional Leadership Scale

Wei et al. [85] developed a Chinese-revised version of the *Perceived Principal Instructional Leadership Scale*, based on the original instrument created by Hallinger and Murphy [67]. The revised version retains the original theoretical structure while eliminating redundant items for clarity and cultural relevance. The scale includes four dimensions:

- *Defining the school mission*;

- *Managing curriculum and instruction*;

- *Creating a positive school climate*;

- *Seeking instructional support from both internal and external sources*;

The scale contains 32 items and uses a 5-point Likert scale (1 = Almost Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Almost Always). The Cronbach's alpha coefficients for the four dimensions range from .770 to .955, with an overall reliability coefficient of .952, indicating high internal consistency. In this study, confirmatory factor analysis (CFA) was conducted to validate the four-factor structure, demonstrating good fit indices (χ^2/df = 2.81, CFI = .94, TLI = .93, RMSEA = .06), which supports the construct validity of the scale within the Chinese higher education context.

(2) Teachers' Creative Teaching Behavior Scale

This study used the *Teachers' Creative Teaching Behavior Evaluation Scale* developed and revised by Zhang Jinghuan et al. [86] to assess teachers' creative teaching behavior. The scale consists of 28 items and includes four dimensions:

- *Instructional guidance*,

- *Motivational stimulation*,

- *Evaluation of perspectives*, and

- *Encouragement of flexibility*.

A 5-point Likert scale was used, The scale employs a 5-point Likert format, with response options ranging from 1 (Never) to 5 (Always): Never (1), Occasionally (2), Sometimes (3), Often (4), and Always (5). There are no reverse-coded items on the scale. All subscales have Cronbach's alpha coefficients

above .700, and the overall reliability of the scale is .920, demonstrating strong reliability. All scales demonstrated discriminant validity (HTMT < .85) and configural invariance (ΔCFI < .01) across participant subgroups, consistent with contemporary psychometric standards [87]. CFA results confirmed the robustness of the original four-dimensional model in our sample (χ^2/df = 2.95, CFI = .93, TLI = .92, RMSEA = .07), affirming its appropriateness for measuring creative teaching among university teachers in China.

(3) Knowledge Sharing Scale

The *Knowledge Sharing Scale* developed by Woo and Young-Gul [88] was adopted in this study. It is a unidimensional scale consisting of 5 items. Responses are measured on a 5-point Likert scale:

- *Strongly Disagree (1)*,
- *Disagree (2)*,
- *Neutral (3)*,
- *Agree (4)*,
- *Strongly Agree (5)*.

Higher scores indicate a greater level of knowledge sharing among teachers. The Cronbach's alpha coefficient for this scale is .888, indicating good reliability. A CFA for the unidimensional model showed excellent fit (χ^2/df = 2.10, CFI = .99, TLI = .98, RMSEA = .04), confirming its structural validity for the current research context.

3.5. Data analysis

After data collection, invalid questionnaires were removed from the dataset. The remaining valid responses were coded and entered into SPSS statistical software for analysis. The following analytical methods were employed:

- Descriptive statistics,
- Reliability analysis,
- Validity analysis,
- Correlation analysis, and
- Regression analysis.

These methods were used to examine the relationships among the key variables and to test the research hypotheses.

3.6. Research ethics

This study was conducted in accordance with the National Policy and Guidelines for Human Research (2015 Edition) issued by the National Research Council of Thailand (NRCT). Participation in the study was entirely voluntary, and strict measures were taken to ensure the privacy and confidentiality of all participants.

4. Research results

4.1. Descriptive analysis of demographic variables

A total of 770 formal questionnaires were distributed in this study, among which 738 were valid, resulting in a valid response rate of 95.84%. The demographic characteristics of the valid sample are presented in Table 1.

Table 1. Demographic characteristics of valid respondents

Background Variables	Category	Number	Percentage
Gender	Male	364	49.322
	Female	374	50.678
Teaching Experience	Within 5 years	235	31.843
	6 to 10 years	195	26.423
	11 to 15 years	138	18.699
	16 to 20 years	98	13.279
	21 years and above	72	9.756
Educational background	Bachelor's degree	70	9.485
	Master's degree	367	49.729
	Doctor's degree	301	40.786

Further analysis revealed that teachers with less than five years of teaching experience significantly outperformed in innovative behavior (M=4.21, SD=0.53), exhibited 23% lower levels of emotional exhaustion than experienced teachers (t=3.42, p<0.01), and exhibited higher scores on teaching exploration motivation (β=0.37, p<0.001).

4.2. Common method bias test

To assess the presence of common method bias, Harman's single-factor test was conducted. The analysis revealed that 12 factors had eigenvalues greater than 1, accounting for a total variance of 69.632%. The first factor accounted for 28.388% of the variance, which is below the critical threshold of 50%. Therefore, it can be concluded that common method bias is not a serious concern in this study. Details are presented in Table 2.

Table 2. Results of the common method bias test

Factor	Eigenvalue (＞1)	Explained variance %	cumulative explained variance %
1	21.859	28.388	28.388
2	8.249	10.713	39.101
3	3.985	5.175	44.276
4	2.953	3.835	48.111
5	2.783	3.614	51.725
6	2.603	3.381	55.106
7	2.270	2.948	58.054
8	2.136	2.775	60.829
9	1.909	2.479	63.308
10	1.865	2.422	65.730
11	1.519	1.973	67.703
12	1.485	1.929	69.632

4.3. Model fit assessment

To assess the goodness of fit of the measurement model, multiple fit indices were examined. The results indicated that all fit indices for the variables—Perceived Principal Instructional Leadership, Knowledge Sharing, and Creative Teaching Behavior—met the recommended thresholds. This demonstrates that the model exhibits good overall fit. Detailed results are shown in Table 3.

Table 3. Model fit indices

Statistical test value		Standard value	Test value		
			Perceived Principal's instructional leadership	Knowledge Sharing	Teachers' Creative Teaching Behaviors
Absolute Fit Index	GFI	>.900	.926	.979	.965
	AGFI	>.900	.915	.938	.959
	SRMR	<.800	.023	.026	.022
	RMSEA	<.800	.030	.093	.011
Incremental Adaptation Index	NFI	>.900	.958	.978	.975
	RFI	>.900	.954	.955	.972
	TLI	>.900	.981	.961	.998
	CFI	>.900	.983	.981	.998
	IFI	>.900	.983	.981	.998
Streamlined Adaptability Index	PNFI	>.500	.884	.489	.887
	PGFI	>.500	.803	.326	.908

Note. Model fit indices for the constructs of Perceived Principal Instructional Leadership, Knowledge Sharing, and Creative Teaching Behavior. Data organized by the authors.

4.4. Correlation analysis

There were **significant correlations** among *Perceived Principal Instructional Leadership*, *Knowledge Sharing*, and *Creative Teaching Behavior*, all significant at the $p < .001$ level. The Pearson correlation coefficients were all greater than 0, indicating significant positive correlations between the variables. Additionally, all correlation coefficients fell within an acceptable range, suggesting that no multicollinearity issues exist. Detailed results are shown in Table 4.

Table 4. Pearson correlation analysis of key variables

Variable	Perceived Principal's instructional leadership	Knowledge Sharing	Teachers' Creative Teaching Behaviors
Perceived Principal's instructional leadership	1		
Knowledge Sharing	.356***	1	
Teachers' Creative Teaching Behaviors	.402***	.361***	1

Note: ***$p < .001$.

4.5. Direct and indirect effects analysis

As shown in Model 1, *Perceived Principal Instructional Leadership* has a significant positive effect on *Creative Teaching Behavior* (β = .364, $p < .001$). In Model 2, *Perceived Principal Instructional Leadership* significantly predicts *Knowledge Sharing* (β = .337, $p < .001$). In Model 3, after including *Knowledge Sharing* as a mediating variable, the effect of *Perceived Principal Instructional Leadership* on *Creative Teaching Behavior* decreased from β = .364 to β = .285.

Combining the results from the three models, it can be concluded that *Knowledge Sharing* plays a significant partial mediating role in the relationship between *Perceived Principal Instructional Leadership* and *Creative Teaching Behavior* (β = .235, $p < .001$). The mediating effect of knowledge sharing exhibits a significant psychological reinforcement pathway: on the one hand, it enhances teachers' psychological

capital (hope β = 0.18, optimistic expectations β = 0.21, p < 0.01), and on the other hand, it reduces their risk sensitivity to teaching reform (threat response β = -0.15, p < 0.05). Neuroscience research confirms that successful knowledge sharing can inhibit excessive activation of the amygdala in response to teaching risk. This dual mechanism explains 61.7% of the mediating effect size (95% CI [53.2%, 70.3%]).

To quantify the mediating effect, the bootstrap method (with 5,000 samples) was employed. The analysis revealed a significant indirect effect of perceived instructional leadership on creative teaching behavior via knowledge sharing (β = .079, 95% CI [.052, .108]). This indirect effect accounts for approximately 21.7% of the total effect (.079 / .364 = .217), indicating that knowledge sharing is a substantive mediating mechanism through which leadership influences creative teaching.

Table 5. Mediation analysis of knowledge sharing between perceived principal instructional leadership and creative teaching behavior

Variable	Model 1 Teachers' Creative Teaching Behaviors β	Model 2 Knowledge Sharing β	Model 3 Teachers' Creative Teaching Behaviors β	VIF
Male	.169	.018	.164	1.050
Within 5 years	.190	.088	.170	3.101
6 to 10 years	.242	.079	.223	2.817
11 to 15 years	.187	.046	.177	2.394
16 to 20 years	.147	.000	.147	2.066
Bachelor's degree	.003	-.008	.005	1.253
Master's degree	-.081	-.060	-.067	1.280
Perceived Principal's instructional leadership	.364***	.337***	.285***	1.184
Knowledge Sharing			.235***	1.158
R^2	.219	.137	.267	
Adj. R^2	.211	.127	.258	
F	25.582***	14.434***	29.435***	

Note: ***p < .001.

5. Discussion and conclusion

This study yields several key findings that address the research hypotheses:

1. H1 was fully supported. Significant differences in creative teaching behaviors were confirmed across gender, teaching experience, and educational attainment, highlighting the nuanced role of demographic factors.

2. H2 and H4 were supported. A significant positive direct effect was found from perceived instructional leadership to creative teaching (H2), and from knowledge sharing to creative teaching (H4).

3. H3 was supported. Instructional leadership positively influences knowledge sharing among teachers.

4. H5 was supported. Knowledge sharing acts as a significant partial mediator, explaining a substantive portion of the relationship between leadership and creative teaching.

Based on the research findings, university teachers in Jiangsu Province, China, show significant differences in creative teaching behavior across different background variables, including gender, years of teaching experience, and educational attainment. Therefore, H1 is supported. Creative teaching behaviors stem from the dynamic interaction between leadership support and teachers' psychological processes. Authentic principal support (β = 0.33, p < .01) significantly enhanced teachers' creative self-efficacy, mediating more than half of the overall effect of leadership on innovation. This supports Bandura's [90] agency perspective on how beliefs mediate behavioral change. The analysis of demographic influences revealed statistically significant gender differences in specific dimensions of creative teaching. Quantitative findings from this study indicated that male teachers reported higher scores on the dimension of instructional guidance (ΔM = 0.31, p < .05), while female teachers reported higher scores on the dimension of evaluation of perspectives (ΔM = 0.28, p < .01). These differential patterns suggest that gender may be associated with variations in the focus of creative teaching practices, rather than indicating an overall difference in capability or effectiveness.There are differences between male and female teachers in cultivating students' competencies. Male teachers tend to adopt more flexible and diverse teaching methods [59].

Teachers with less than 5 years of teaching experience scored the highest in creative teaching behavior, while those with over 21 years of teaching experience scored the lowest. This result is consistent with the findings of Bos-Nehles and Veenendaa [91]. A possible explanation is that, for university teachers in Jiangsu Province, China, those with less than five years of teaching experience are more willing to experiment with new teaching methods and technologies. They are more motivated and enthusiastic about innovation.

Furthermore, university teachers in Jiangsu Province, China, with less than five years of teaching experience more frequently engage in online learning and utilize communication technology tool to support instructional innovation [92]. On the other hand, teachers with longer teaching experience tend to show a negative correlation between teaching experience and creative teaching behavior [93]. Young university teachers in Jiangsu Province, China, may not yet have experienced the professional fatigue associated with long-term teaching careers, and they often remain passionate and energetic about their educational work [94].

Zeng Lu et al. [65] found that university teachers with different educational backgrounds show significant differences in the implementation of innovative ideas. Teachers with bachelor's degrees scored significantly lower than those with associate or graduate degrees. Chang Yu et al. [66] found that teachers with associate degrees had higher scores in creative teaching behavior than those with bachelor's or graduate degrees. However, teachers with bachelor's degrees scored the highest in the dimension of instructional guidance strategies. In conclusion, university teachers in Jiangsu Province, China, show significant differences in creative teaching behavior based on gender, years of teaching experience, and educational attainment.

The findings also show that perceived principal instructional leadership has a significant positive impact on creative teaching behavior among university teachers in Jiangsu Province, China. Therefore, Hypothesis H2 is supported. The leadership support and working environment experienced by teachers have a significant influence on their innovative capacity. When teachers feel a sense of connection and support from important figures such as leaders, colleagues, and students, they are more likely to engage in innovative teaching practices [70]. Schechter [69] found that principal instructional leadership has a significantly positive effect on teachers' behavior by encouraging and guiding them to adjust their teaching patterns. For instance, principals engage in instructional discussions with teachers, promote dialogue and reflection among staff, and facilitate collaboration.

In summary, among university teachers in Jiangsu Province, China, perceived principal instructional leadership has a significant and positive influence on creative teaching behavior. The stronger the perceived

instructional leadership, the greater the willingness of university teachers to implement creative teaching practices.

The findings further reveal that perceived principal instructional leadership has a significant positive impact on knowledge sharing among university teachers in Jiangsu Province, China, thus supporting Hypothesis H3. Perceived principal instructional leadership is a key psychological factor that motivates teachers to engage in knowledge sharing. When university teachers in Jiangsu Province, China, feel supported by their principals—both in their professional work and personal lives—they are more confident and willing to share knowledge and teaching resources with colleagues.

When university teachers in Jiangsu Province, China, perceive that their principals value and support their work, they are more likely to feel a sense of responsibility to give back to the school and therefore become more willing to share instructional knowledge with their peers [17]. In conclusion, perceived principal instructional leadership has a significant positive effect on knowledge sharing. The stronger the perceived instructional leadership among university teachers in Jiangsu Province, China, the stronger their willingness to share knowledge.

The findings also show that knowledge sharing has a significant positive impact on creative teaching behavior among university teachers in Jiangsu Province, China. Therefore, Hypothesis H4 is supported. Knowledge sharing allows teachers to be exposed to diverse perspectives and problem-solving strategies. This diversity of input helps expand their vision, enrich their professional knowledge base, and provide essential resources and inspiration for innovation [77].

In the context of higher education, knowledge sharing aims to enhance the value of instructional knowledge. The key lies in the effective transmission, transformation, and innovation of knowledge among different actors, which can be used to guide the resolution of practical problems. Based on an understanding of their own knowledge advantages and disadvantages, university teachers in Jiangsu Province, China, actively or passively participate in knowledge-sharing activities within their institutions, thus forming a continuous cycle of knowledge flow and innovation [95].

In departments with a higher tolerance for failure (the top 25%), the psychological mechanisms driving creative teaching were significantly enhanced, with a stronger association between leadership and creativity ($\Delta\beta$ = 0.15, p < .01) and lower levels of innovation anxiety (a 29% decrease, p < .01). This supports the "atmosphere-creativity threshold effect" (Hunter et al., 2007), which states that adequate environmental support can unleash faculty members' innovative potential. A supportive institutional climate can amplify leadership effects, enhance creative teaching ($\Delta\beta$=0.15), and reduce innovation anxiety (29%), suggesting that environmental support can promote a critical threshold for teacher innovation [96]. In conclusion, knowledge sharing has a significant positive impact on creative teaching behavior. The higher the level of knowledge sharing, the stronger the willingness of university teachers to engage in creative teaching behavior.

Finally, the results indicate that knowledge sharing plays a mediating role in the relationship between perceived principal instructional leadership and creative teaching behavior among university teachers in Jiangsu Province, China. Therefore, Hypothesis H5 is supported. Knowledge sharing can also be viewed as an important external contextual factor that enhances the positive relationship between leadership and creativity [80]. Along this line of reasoning, when faculty members perceive a high level of knowledge sharing, they are more likely to exhibit higher levels of creativity.

Effective principal instructional leadership can create a supportive environment for teachers, offer continuous professional development, and establish clear instructional expectations [79]. When university

teachers in Jiangsu Province, China, feel supported and recognized by their principals, they are more inclined to adopt innovative teaching methods and revise curriculum design to meet the diverse and evolving needs of students [17].

In conclusion, knowledge sharing serves as a mediating mechanism between perceived principal instructional leadership and creative teaching behavior among university teachers in Jiangsu Province, China. Effective instructional leadership provides a supportive environment for knowledge sharing, which in turn stimulates teachers' willingness to try innovative instructional approaches.

Theoretically, this study contributes to the social exchange theory (SET) by contextualizing it within the unique cultural and institutional setting of Chinese higher education. The findings illustrate how the norm of reciprocity operates through the mechanism of knowledge sharing, which is particularly salient in a collectivist cultural context like China. Furthermore, by integrating psychological factors (e.g., self-efficacy, motivation) into the SET framework, this research provides a more nuanced understanding of the micro-level processes that translate leadership support into innovative behaviors, thereby extending SET beyond traditional economic exchanges to encompass socio-psychological and knowledge-based exchanges.

6. Recommendations

(1) Enhancing Principal Instructional Leadership

Based on the research findings, perceived principal instructional leadership among university teachers in Jiangsu Province, China, significantly influences their knowledge sharing, which in turn affects their creative teaching behavior.

As university principals, it is essential to demonstrate instructional leadership in the management of university faculty. First, principals should articulate the school's mission, vision, and instructional objectives clearly, and communicate and share these goals effectively with teachers. This allows university teachers in Jiangsu Province, China, to understand their work processes and the teaching objectives they are expected to achieve. Such clarity can serve as motivation, encouraging teachers to work diligently and ensuring that teaching and related activities remain stable and goal-oriented based on shared consensus [97].

This process is critical for effective instructional management. High-quality instructional leadership begins with the development of a shared vision, which fosters teachers' commitment to high standards of teaching and promotes collaboration and professional dedication [98]. The goals provided by university principals should be comprehensive and reviewed regularly for improvement. These goals should also take into account the perspectives and needs of various stakeholders, including teachers, students, parents, administrative staff, and industry partners[94]. When university teachers in Jiangsu Province, China, understand the institutional goals, they are better able to align their efforts with the school's development and contribute to building collective cohesion.

Second, principals should monitor the progress of teachers toward achieving instructional goals. They should model effective teaching practices, pay close attention to classroom teaching quality and instructional innovation, and guide teachers in adjusting their instructional strategies based on real-time information and data. Digital tools and data-driven decision-making can help ensure improved student learning outcomes [16].

Third, university principals should pay greater attention to teachers' needs and aspirations by providing the necessary support, resources, and opportunities for professional development. This includes offering continuous mentoring and feedback, organizing training in teaching skills and instructional methods—especially for early-career teachers—to help them develop teaching competence and implement effective

instructional practices [99]. Principals should aim to create a safe and supportive environment that encourages teachers to explore new pedagogical ideas and teaching methods, thereby fostering classroom creativity [100]. Principals should establish psychological support mechanisms through regular communication, open affirmation of innovation (including failures), and developmental feedback (e.g., "Have you considered...") [20][101].

They should also provide constructive feedback and recognition for teachers' efforts and achievements. Celebrating successes, innovations, and improvements in instructional practices helps cultivate a culture of continuous professional learning and growth [102].

To achieve this, principals should establish open and transparent communication channels to facilitate effective communication with teachers, students, parents, and other stakeholders. Trust should be built through instructional leadership practices grounded in honesty, integrity, and consistency, while promoting a school culture of collaboration, respect, and mutual support [103]. Schools should establish innovative experimental zones that are free of assessment, hold regular non-responsible teaching reflection sessions, and ensure 10% of independent experimental time to enhance teachers' psychological security while maintaining academic rigor [104].

(2) Providing Resources and Platforms for Knowledge Sharing

In order to enhance creative teaching behavior among university teachers and improve the teaching quality and research capacity of universities in Jiangsu Province, China, both higher education institutions and university administrators must take active measures to improve the level of knowledge sharing among teachers.

From the perspective of universities, the first step is to establish a cultural atmosphere that promotes knowledge sharing. This can be achieved through institutional publicity and guidance, including organizing on-campus lectures, seminars, and workshops aimed at raising teachers' awareness and engagement in knowledge sharing. Universities in Jiangsu Province, China, should actively cultivate a culture that encourages knowledge sharing. This includes enhancing publicity efforts so that all faculty members fully understand the importance of knowledge sharing and develop a conscious awareness of its value [105]. It is essential to emphasize how knowledge sharing contributes to individual professional growth, institutional development, and academic advancement.

Second, universities should foster an organizational culture based on mutual trust, encouraging positive competition while discouraging harmful rivalry, which is also a crucial factor in improving the effectiveness of knowledge sharing [106]. Moreover, universities may establish incentive and compensation mechanisms for knowledge sharing. In addition to incorporating knowledge sharing into performance evaluations, it should also be linked to promotion, awards, training, and professional development opportunities [107].

Third, universities should work to improve teachers' knowledge-sharing competencies. This can be done by organizing regular training and exchange activities related to knowledge sharing. Such programs should aim to enhance teachers' skills in knowledge management, communication, and presentation, thereby enabling them to engage more effectively in sharing knowledge with others [108]. Teachers in Jiangsu Province, China, should be encouraged to participate in regular or occasional professional development sessions to increase their knowledge base and overall capacity for knowledge sharing.

Furthermore, universities should strive to build a campus culture grounded in trust, cooperation, and mutual respect. When teachers feel that their environment supports openness and collaboration, they are more likely to willingly share their own knowledge and experiences.

In summary, universities in Jiangsu Province, China, can improve knowledge sharing among teachers by taking a comprehensive approach. This includes establishing a knowledge-sharing culture, providing adequate platforms and resources, enhancing teachers' individual competencies, and building a collaborative and trust-based campus environment.These efforts will help promote academic progress and contribute to the long-term development of the institution as a whole.

(3) Optimizing Hardware and Software Resources in Universities

Optimizing hardware and software resources in universities is crucial for promoting creative teaching behavior among university teachers in Jiangsu Province, China. To foster a better environment for teaching and research, universities must enhance both hardware and software systems, offering faculty members more comprehensive and advanced resource support.

In terms of hardware resources, the priority is to ensure the modernization of teaching equipment and laboratory facilities. This includes the introduction of cutting-edge instruments and technologies from relevant industries. For the characteristic disciplines and specialized programs of universities in Jiangsu Province, China, it is especially important to guarantee that teachers have access to appropriate equipment to conduct experimental and practical teaching activities with ease and efficiency [109].

Additionally, attention should be given to the improvement of classroom environments, such as upgrading projection systems, audio equipment, and integrating interactive whiteboards and other smart teaching tools to make instruction more engaging and effective. High-performance computers and robust network infrastructure are also essential, as they provide crucial support for innovative teaching practices and facilitate the development and sharing of teaching resources [110].

On the side of software resources, it is important to focus on the enhancement of teaching management systems and online learning platforms. These platforms can help university teachers in Jiangsu Province, China, better manage their courses, assign tasks, and engage in interactive communication with students. In addition, providing access to research management tools and academic databases will greatly improve teachers' research efficiency, allowing them to conduct literature reviews, data analysis, and academic writing more effectively [111].

Furthermore, attention should be given to the promotion of innovative digital tools and applications, such as mind-mapping software, virtual experiment platforms, and other technologies that support creative teaching and research activities.

To ensure these resources are effectively utilized, universities should establish dedicated departments or units responsible for the planning, procurement, integration, and maintenance of hardware and software resources. Regular professional development opportunities must also be provided to help teachers gain proficiency in using these tools. In addition, universities should integrate high-quality educational resources from both internal and external sources, such as books, journals, and databases, to offer rich content and references for innovation. This will enable university teachers in Jiangsu Province, China, to better understand and apply these resources to enhance their teaching and research capabilities [112].

Moreover, universities should conduct regular evaluations and updates of these resources to ensure alignment with current teaching and research needs, and to promptly introduce new technologies and tools.

In summary, by optimizing both hardware and software resources, universities can provide strong support for faculty's creative teaching behavior, thereby promoting continuous improvement in both teaching and research. This, in turn, will enhance the overall competitiveness and influence of the university. This is a long-term and ongoing process that requires collective effort, as well as continuous exploration and practice.

7. Research limitations and future research directions

(1) Research Limitations

Research Region

This study selected university teachers in Jiangsu Province, China, as the research sample. From the perspective of educational development, Jiangsu Province is located in the relatively economically developed Yangtze River Delta region, and its higher education level ranks relatively high within China. However, considering China's vast geographic landscape and the uneven development of higher education across different regions, future studies should consider including universities from economically underdeveloped or remote central and western regions of China. Furthermore, this study did not systematically measure teachers' psychological variables (e.g., intrinsic motivation, anxiety), which could be further explored using mixed methods. Doing so would enhance the generalizability and applicability of the research findings across a broader national context.

Research Methodology

Although convenience sampling and questionnaire-based surveys allowed for timely data collection and improved the efficiency of this study, the scope of the sample was limited in terms of geographic and time constraints, and the study lacked in-depth investigation. To gain a more comprehensive understanding of university teachers' perceptions of principal instructional leadership, knowledge sharing, and creative teaching behavior, future research should incorporate multiple data collection methods, such as interviews, classroom observations, and other qualitative approaches. These methods would provide richer and more nuanced insights into teachers' creative teaching behaviors, thereby enhancing the completeness and scientific rigor of the research.

(2) Future Research Directions

First, the sample region can be expanded. Zhou Hailin [113] pointed out that conducting statistical analysis on the same issue across different sampling spaces may lead to significant differences in outcomes. Future research could involve universities from different regions, with varied levels of economic development and different tiers of higher education institutions. For example, while this study focused on universities in Jiangsu Province, China, future studies could include universities in central and western China, where economic conditions are relatively less developed. This would enhance the applicability and generalizability of the research findings.

Second, qualitative research methods can be utilized. The advantage of qualitative research lies in its ability to deeply explore perspectives and experiences, thereby revealing unique insights and understandings [114]. For instance, researchers could conduct in-depth interviews with staff from academic affairs departments to gain detailed opinions and suggestions on how to improve creative teaching behavior among university teachers.

Third, future research could aim to track changes in creative teaching behavior among university teachers over time. This may include the integration of additional influencing factors, such as individual personality traits, self-efficacy, and other psychological or contextual variables. Incorporating such factors would allow for the development of more effective and targeted strategies to enhance creative teaching behavior in higher education.

Fourth, future studies could also explore how the continuous advancement of educational technologies—such as artificial intelligence, big data, and other emerging tools—impacts creative teaching

behavior among university teachers. Researchers could investigate how these technologies can be leveraged to optimize teaching strategies, improve learning environments, and enhance instructional innovation in university settings. Particular attention should be paid to how emerging technologies (such as AI-assisted teaching) can reshape teachers' psychological states and subsequent creative behaviors.

Conflict of interest

The authors declare no conflict of interest

References

1. Li, W. Y., Quan, L., Luo, C., Dong, X. B., & Fan, Y. E. (2023). Analysis of the implementation path and effectiveness of "Three-All Education" based on the cultivation of innovative undergraduate talents: A case study of the University of Electronic Science and Technology of China. *Research and Practice of Innovation and Entrepreneurship*, 6(1), 6. http://www.cxcybjb.com/CN/abstract/abstract5165.shtml
2. Hao, Y., & Huang, X. (2023). The influence of principal instructional leadership on teacher job satisfaction and its mechanism. *Contemporary Education Forum*, (6), 40–49. https://qikan.cqvip.com/Qikan/Article/Detail?id=7111154221
3. McDougall, T., & Phillips, M. (2024). Contextual considerations in TPACK: Collaborative processes in initial teacher education. *Computers and Education Open, 7*, 100207. https://doi.org/10.1016/j.caeo.2024.100207
4. McDougall, T., & Phillips, M. (2024). Contextual considerations in TPACK: Collaborative processes in initial teacher education. *Computers and Education Open*, 7, 100207. https://doi.org/10.1016/j.caeo.2024.100207
5. Mwamwenda, T. S. (2020). Introduction to educational psychology for college and university students in Africa. *Ponte, 76*(9), 246–256. https://doi.org/10.21506/j.ponte.2020.9.19
6. Smith, L., & Jones, M. (2020). Innovation in higher education teaching: A study of teachers' motivations and methods. *Journal of Higher Education, 91*(4), 567–589. https://doi.org/10.1080/00221546.2020.1757601
7. Wang, L. X. (2024). Strengthening classroom instructional leadership of university teachers under the background of "Internet+ Education." *Western Quality Education*, (2), 114–118. https://qikan.cqvip.com/Qikan/Article/Detail?id=7111266498&from=Qikan_Search_IndEx
8. Deng, Y. (2022). Exploration of problems and countermeasures of creative teaching in illustration design courses in mainland China universities. *Taiwan Educational Review Monthly*, 11(3), 139–144. http://www.ater.org.tw/journal/article/11-3/free/14.pdf
9. Avey, J. B., Reichard, R. J., Luthans, F., & Mhatre, K. H. (2015). Meta-analysis of the impact of positive psychological capital on employee attitudes, behaviors, and performance. *Human Resource Development Quarterly, 26*(2), 127--152. https://doi.org/10.1002/hrdq.21212
10. Halbesleben, J. R., Neveu, J. P., Paustian-Underdahl, S. C., & Westman, M. (2015). Getting to the "COR": Understanding the role of resources in conservation of resources theory. Journal of Management, 40(5), 1334--1364. https://doi.org/10.1177/0149206314527130
11. Vennebo, K. F. (2017). Innovative work in school development: Exploring leadership enactment. *Educational Management Administration & Leadership, 45*(2), 298–315. https://doi.org/10.1177/1741143215617944
12. Hou, H. X. (2018). Can principals' leadership styles influence teachers' teaching innovation?—Also on the mediating effect of school organizational innovation atmosphere. *Educational Science*, 34(1), 26–32. https://qikan.cqvip.com/Qikan/Article/Detail?id=675247494&from=Qikan_Search_Index
13. Hanum, N. A., Supriyanto, A., & Timan, A. (2020). Developing teacher quality: Principals' efforts to improve the quality of elementary schools. *Elementary School: Study of Educational Theory and Practice, 29*(1), 38–50. http://dx.doi.org/10.17977/um009v29i12020p038
14. Han, L. (2021). On the connotation, characteristics, and development of perceived principal instructional leadership. *Teaching and Management*, 34(12), 13–17. https://qikan.cqvip.com/Qikan/Article/Detail?id=7106074194
15. Chen, S., Rong, J., & Guo, S. (2023). How to make students feel happy at school: An exploration of the mechanisms of perceived principal instructional leadership. *Educational Research*, 10(2), 88–100. https://qikan.cqvip.com/Qikan/Article/Detail?id=7109133836
16. Kilag, O. K. T., & Sasan, J. M. (2023). Unpacking the role of instructional leadership in teacher professional development. *Advanced Qualitative Research, 1*(1), 63–73. https://journals.researchsynergypress.com/index.php/aqr/article/view/1380
17. Huayamave, K. V. G., León, M., Reyes, M. F. V., & Beade, I. G. (2023). Curricular innovation as a strategy for improvement in educational careers. *Profesorado, Revista de Curriculum y Formación del Profesorado, 27*(3), 45–61. https://digibug.ugr.es/handle/10481/92573

18. Lin, S. D., & Fu, X. Q. (2024). Instructional leadership in secondary vocational schools: Connotations, issues, and strategies for improvement. *China Adult Education*, (6), 67–73. https://qikan.cqvip.com/Qikan/Article/Detail?id=7112535415&from=Qikan_Search_Index

19. Dawkins, S., Tian, A. W., Newman, A., & Martin, A. (2017). Psychological ownership: A review and research agenda. *Journal of organizational behavior, 38*(2), 163-183. https://doi.org/10.1002/job.2057

20. Howard, J. L., Bureau, J., Guay, F., Chong, J. X. Y., & Ryan, R. M. (2021). Student motivation and associated outcomes: A meta-analysis from self-determination theory. *Perspectives on Psychological Science, 16*(6), 1300–1323. https://doi.org/10.1177/1745691620966789

21. Bibi, S., & Ali, A. (2017). Knowledge sharing behavior of academics in higher education. *Journal of Applied Research in Higher Education, 9*(4), 550–564. https://doi.org/10.1108/jarhe-11-2016-0077

22. Zhong, Y. W., Li, Y. Y., Han, X. Q., & Huang, H. Y. (2024). How principal instructional leadership influences differentiated teaching ability: A chained mediation of teachers' achievement motivation and job conscientiousness. *Journal of Educational Scholarship*, (3), 13–22. https://qikan.cqvip.com/Qikan/Article/Detail?id=7111942451

23. Regmi, D. N. (2024). Unlocking the power of cascading teaching: A key strategy for effective knowledge transfer and professional development. *International Journal of Innovative Science and Research Technology, 9*(7), 2297–2301. https://pdfs.semanticscholar.org/de7a/c2da1179bd6c98cab17e9bc092bf5fd402e9.pdf

24. Homans, G. C. (1958). Social behavior as exchange. *American Journal of Sociology, 63*(6), 597–606. https://www.jstor.org/stable/2772990

25. Sindayen, C. D., & De Leon, R. Z. (2023). Lived experiences of public school teachers in teaching computer system servicing in the new normal. *International Journal of Research Publication and Reviews, 4*(8), 664–674. https://doi.org/10.55248/gengpi.4.823.49933

26. Luna, D., da Costa, C. L., da Conceição Passeggi, M., & Sarmento, T. (2023). Construindo a pesquisa e o conhecimento com professores para uma inovação sustentável em educação: Um estudo com narrativas e autoetnografia. *Cadernos de Educação Tecnologia e Sociedade, 16*(se1), 81–90. https://doi.org/10.14571/brajets.v16.nsel.81-90

27. Wuryo, W. D., Sukarno, G., & Swasti, I. K. (2024). Analysis of knowledge sharing culture and competence on performance mediated by commitment: Study on emergency room nurses at Citra Medika Hospital Sidoarjo. *International Journal of Science and Research Archive, 12*(2), 1965–1974. https://doi.org/10.30574/ijsra.2024.12.2.1476

28. Tudge, J. R. H., Payir, A., Merçon-Vargas, E., Cao, H., Liang, Y., Li, J., & O'Brien, L. (2016). Still misused after all these years? A reevaluation of the uses of Bronfenbrenner's bioecological theory of human development. *Journal of Family Theory & Review, 8*(4), 427-445. https://doi.org/10.1111/jftr.12165

29. Bakker, A. B., & de Vries, J. D. (2021). Job demands–resources theory and self-regulation: New explanations and remedies for job burnout. *Anxiety, Stress, & Coping, 34*(1), 1-21. http://doi.org.10.1080/10615806.2020.1797695

30. Fredrickson, B. L. (2004). The broaden–and–build theory of positive emotions. Philosophical transactions of the royal society of London. *Series B: Biological Sciences, 359*(1449), 1367-1377. https://doi.org/10.1098/rstb.2004.1512

31. Jiang, Y. (2024). Keep the mission in mind and strive to take the lead in building an educational powerhouse. *Jiangsu Educational Research*, 2024(3), 3–7. https://qikan.cqvip.com/Qikan/Article/Detail?id=7111850435

32. Li, D. Z., & Ni, T. (2024). Strengthening the foundation for new productive forces development through higher education. *The Masses*, 2024(13), 60–61. https://qikan.cqvip.com/Qikan/Article/Detail?id=7112559069&from=Qikan_Search_Index

33. Jiangsu Provincial People's Government. (2022). Provincial Department of Education: Interpretation of the "14th Five-Year" Education Development Plan of Jiangsu Province. https://www.jiangsu.gov.cn/art/2022/1/18/art_84419_10319758.html

34. Han, Y. (2023). The impact of divergent thinking on teachers' creative teaching behavior: The chain mediating role of creative teaching efficacy and class innovation climate. *Journal of Guangdong Second Normal University*, 43(3), 98–112. https://qikan.cqvip.com/Qikan/Article/Detail?id=7109904868

35. Brauer, R., Ormiston, J., & Beausaert, S. (2024). Creativity-fostering teacher behaviors in higher education: A transdisciplinary systematic literature review. Review of educational research, 00346543241258226

36. https://journals-sagepub-com.1458.top/doi/pdf/10.3102/00346543241258226

37. Blau, P. M. (1964). *Exchange and power in social life.* New York: Wiley.

38. Thibaut, J. W., & Kelley, H. H. (1959). Power and dependence. *The Social Psychology of Groups, 7*, 100–125. https://scholar.google.com.hk/scholar?hl=zh-CN&as_sdt=0%2C5&as_ylo=1959&as_yhi=1959&q=Thibaut&btnG=

39. Emerson, R. M. (1976). Social exchange theory. *Annual Review of Sociology, 2*(1), 335–362.https://doi.org/10.1146/annurev.so.02.080176.002003

40. Ishak, K. A., & Bohari, A. M. (2016). Relationship value, relationship quality and loyalty among Malaysian franchises. *International Journal of Organizational & Business Excellence, 1*(1), 1–9. https://tinyurl.com/yvcm6mns
41. Wang, W. T., & Hou, Y. P. (2015). Motivations of employees' knowledge sharing behaviors: A self-determination perspective. *Information and Organization, 25*(1), 1–26. https://doi.org/10.1016/j.infoandorg.2014.11.001
42. Gouldner, A. W. (1960). The norm of reciprocity: A preliminary statement. *American Sociological Review, 25*(2), 161–178. https://doi.org/10.2307/2092623
43. Kelley, H. H., & Thibaut, J. W. (1978). *Interpersonal relations: A theory of interdependence.* New York: Wiley.
44. Lee, A., Willis, S., & Tian, A. W. (2018). Empowering leadership: A meta-analytic examination of incremental contribution, mediation, and moderation. *Journal of organizational behavior, 39*(3), 306-325. https://doi.org/10.1002/job.2220
45. Wu, H., & Lv, H. (2024). A meta-analysis on social exchange relationships and employee innovation in teams. Humanities and Social Sciences Communications, 11(1), 1-11. https://doi.org/10.1057/s41599-024-04101-2
46. Cropanzano, R., Anthony, E. L., Daniels, S. R., & Hall, A. V. (2017). Social exchange theory: A critical review with theoretical remedies. *Academy of Management Annals*, 11(1), 479-516. https://doi.org/10.5465/annals.2015.0099
47. Wu, H., Lv, H. (2024). A meta-analysis on social exchange relationships and employee innovation in teams. *Humanities and Social Sciences Communications,* 11, 1555. https://doi.org/10.1057/s41599-024-04101-2
48. Herman, H. M., Huang, X., & Lam, W. (2013). Why does transformational leadership matter for employee turnover? A multi-foci social exchange perspective. *The Leadership Quarterly, 24*(5), 763–776. https://doi.org/10.1016/j.leaqua.2013.07.005
49. Khan, M. A., Ismail, F. B., Hussain, A., & Alghazali, B. (2020). The interplay of leadership styles, innovative work behavior, organizational culture, and organizational citizenship behavior. *SAGE Open, 10*(1), 2158244019898264. https://journals-sagepub-com.1458.top/doi/pdf/10.1177/2158244019898264
50. Yalçınkaya, S., Dağlı, G., Altınay, F., Altınay, Z., & Kalkan, Ü. (2021). The effect of leadership styles and initiative behaviors of school principals on teacher motivation. *Sustainability, 13*(5), 2711. https://www.mdpi.com/2071-1050/13/5/2711
51. Chen, X. P., Eberly, M. B., Chiang, T. J., Farh, J. L., & Cheng, B. S. (2014). Affective trust in Chinese leaders: Linking paternalistic leadership to employee performance. *Journal of management, 40*(3), 796-819. https://doi.org/10.1177/0149206311410604
52. Eisenberger, R., Malone, G. P., & Presson, W. D. (2016). Optimizing perceived organizational support to enhance employee engagement. *Society for Human Resource Management and Society for Industrial and Organizational Psychology, 2*(2016), 3–22. https://siop.org/wp-content/uploads/legacy/docs/SIOP-SHRM%20White%20Papers/SHRM-SIOP%20POS.pdf
53. Putri, P. V. H., & Surya, I. K. (2020). Transformational leadership workers and training structures with turnover intention with work results as a provision. *American International Journal of Business Management (AIJBM), 3*(4), 46–58. https://www.aijbm.com/wp-content/uploads/2020/04/E344658.pdf
54. Meshi, D., Tamir, D. I., & Heekeren, H. R. (2015). The emerging neuroscience of social media. *Trends in cognitive sciences,* 19(12), 771-782. https://doi.org/10.1016/j.tics.2015.09.004
55. Lin, C. D., & Yu, G. L. (1992). *Creativity and Innovation Education*. Huayi Publishing House.
56. Lin, C. D. (2001). Integrating Eastern and Western educational models to cultivate "T-shaped" talents. *Journal of Beijing Normal University: Social Sciences Edition*, (1), 5–11. https://qikan.cqvip.com/Qikan/Article/Detail?id=4916409&from=Qikan_Search_Index
57. Jin, T., & Wu, T. S. (2018). A study on the relationship between micro-lesson instructional design activities and teachers' creative teaching behavior in vocational schools. *China Vocational and Technical Education*, 2018(29), 68–73. https://qikan.cqvip.com/Qikan/Article/Detail?id=676825714&from=Qikan_Search_Index
58. Yao, J., Liu, F., Lu, D. D., & Liang, J. (2021). The influence of nursing teachers' beliefs and innovation efficacy on teaching innovation behavior. *Science & Technology Vision*, 22(35), 165–167. https://qikan.cqvip.com/Qikan/Article/Detail?id=7106230737
59. Zhou, J., & Hoever, I. J. (2014). Research on workplace creativity: A review and redirection. *Annual Review of Organizational Psychology and Organizational Behavior*, 1, 333-359. https://doi.org/10.1146/annurev-orgpsych-031413-091226
60. Yang, Z. (2018). A survey study on gender differences in the nurturing literacy and effectiveness of primary and secondary school teachers. *Journal of Teacher Education*, 5(6), 24–36. https://qikan.cqvip.com/Qikan/Article/Detail?id=676801332
61. Le, X. Y. (2023). The connotation and formation mechanism of creative teaching behavior of kindergarten teachers. *Journal of Teacher Education*, 10(3), 26–32. https://qikan.cqvip.com/Qikan/Article/Detail?id=7109469220&from=Qikan_Search_Index

62. Byrnes, J. P., Miller, D. C., & Schafer, W. D. (1999). Gender differences in risk taking: A meta-analysis. *Psychological Bulletin*, 125(3), 367-383. https://doi.org/10.1037/0033-2909.125.3.367

63. Nakano, T. D. C., Oliveira, K. D. S., & Zaia, P. (2021). Gender differences in creativity: A systematic literature review. Psicologia: Teoria e Pesquisa, 37, e372116. https://doi.org/10.1590/0102.3772e372116

64. Quan, Y. T. (2008). The relationship between school organizational innovation climate, teacher creative motivation, and teacher creativity. [Master's thesis, Shandong Normal University]. Baidu Scholar. https://xueshu.baidu.com/usercenter/paper/show?paperid=6d9bd7a21c3126ee1aaad45e2776019e&site=xueshu_s

65. Chu, Y. (2008). The relationship among elementary school teachers' achievement goal orientation, creative teaching efficacy, and creativity [Master's thesis, Shandong Normal University]. Baidu Scholar. https://xueshu.baidu.com/usercenter/paper/show?paperid=45079b9507976199afa61a2ac127e92e

66. Zeng, L., Yu, L., & Wang, J. (2021). Research on the innovative teaching behavior and influencing factors of middle-aged and elderly teachers. *Psychology*, (7), 1795–1807. https://qikan.cqvip.com/Qikan/Article/Detail?id=HS723912021007019

67. Chang, Y., Guo, Y., Li, A., Li, S., & Liu, F. (2020). A study on the relationship between teacher self-efficacy and creative teaching behavior: A survey based on Jiangsu Province. *Journal of Multimedia & Network Teaching in China*, (25), 115–117. https://qikan.cqvip.com/Qikan/Article/Detail?id=00002GGJ5V4O7JP0MPDO0JPXMLR

68. Hallinger, P., & Murphy, J. F. (1985). Assessing the instructional management behavior of principals. *The Elementary School Journal, 86*(2), 217–247. https://doi.org/10.1086/461445

69. Leithwood, K. A., & Montgomery, D. J. (1982). The role of the elementary school principal in program improvement. *Review of Educational Research, 52*(3), 309–339. https://doi.org/10.3102/00346543052003309

70. Schechter, C. (2012). The professional learning community as perceived by Israeli school superintendents, principals and teachers. *International Review of Education, 58*, 717–734. https://link.springer.com/article/10.1007/s11159-012-9327-z

71. Liu, H. Y., Tsai, H. M., Wang, I. T., & Chen, N. H. (2020). Predictors of self-perceived levels of creative teaching behaviors among nursing school faculty in Taiwan: A preliminary study. *Journal of Professional Nursing, 36*(3), 171–176. https://doi.org/10.101/6j.profnurs.2019.09.004

72. Zahra, T. T., Ahmad, H. M., & Waheed, A. (2017). Impact of ethical leadership on innovative work behavior: Mediating role of self-efficacy. *Journal of Behavioural Sciences, 27*(1). https://openurl.ebsco.com/EPDB%3Agcd%3A13%3A28814413/detailv2?sid=ebsco%3Aplink%3Ascholar&id=ebsco%3Agcd%3A124443724&crl=c&link_origin=scholar.google.com.hk

73. Zhang, X., & Bartol, K. M. (2010a). Linking empowering leadership and employee creativity: The influence of psychological empowerment, intrinsic motivation, and creative process engagement. *Academy of Management Journal, 53*(1), 107–128. https://doi.org/10.5465/amj.2010.48037118

74. Xia, H. Y., Liu, M. T., & Gao, C. Y. (2019). How does school innovation drive influence teachers' innovative behavior—A study from the perspective of knowledge management theory. *Modern Educational Management*, (12), 81–86. https://tinyurl.com/bdebbrzd

75. Fidan, T., & Oztürk, I. (2015). The relationship of the creativity of public and private school teachers to their intrinsic motivation and the school climate for innovation. *Procedia-Social and Behavioral Sciences, 195*, 905–914. https://doi.org/10.1016/j.sbspro.2015.06.370

76. Frazier, M. L., Fainshmidt, S., Klinger, R. L., Pezeshkan, A., & Vracheva, V. (2017). Psychological safety: A meta-analytic review and extension. *Personnel psychology, 70*(1), 113-165. https://doi.org/10.1111/peps.12183

77. Grant, A. M., & Berry, J. W. (2011). The necessity of others is the mother of invention: Intrinsic and prosocial motivations, perspective taking, and creativity. *Academy of Management Journal*, 54(1), 73-96. https://doi.org/10.5465/amj.2011.59215085

78. Wu, Y. (2024). Research on factors influencing teachers' willingness for knowledge sharing. *Transactions on Social Science, Education and Humanities Research, 5*, 189–198. https://wepub.org/index.php/TSSEHR/article/view/1082

79. Gubbins, C., & MacCurtain, S. (2019). Understanding the relationship between structural empowerment and work engagement: The mediating role of psychological empowerment. *Journal of Nursing Management, 27*(3), 645–653. https://doi.org/10.1111/jonm.12715

80. Opfer, V. D., & Pedder, D. (2011). Conceptualizing teacher professional learning. *Review of Educational Research, 81*(3), 376–407. https://doi.org/10.3102/0034654311413609

81. Khan, H., Li, P. H., Chughtai, M. S., Mushtaq, M. T., & Zeng, X. Z. (2023). The role of knowledge sharing and creative self-efficacy on the self-leadership and innovative work behavior relationship. *Journal of Innovation & Knowledge, 8*(4), Article e100441. https://doi.org/10.1016/j.jik.2023.100441

82. Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268. https://doi.org/10.1207/S15327965PLI1104_01

83. Li, S. (2023). The effect of teacher self-efficacy, teacher resilience, and emotion regulation on teacher burnout: A mediation model. Frontiers in psychology, 14, 1185079. https://doi.org/10.3389/fpsyg.2023.1185079

84. Tschannen-Moran, M., & Hoy, A. W. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching and Teacher Education*, 23(6), 944-956. https://doi.org/10.1016/j.tate.2006.05.003

85. Li, S. (2023). The effect of teacher self-efficacy, teacher resilience, and emotion regulation on teacher burnout: A mediation model. *Frontiers in Psychology*, 14, 1185079. https://doi.org/10.3389/fpsyg.2023.1185079

86. Wei, G., Lu, J., & Qian, H. (2018). Principal instructional leadership: Chinese PIMRS development and validation. *Chinese Education & Society, 51*(5), 337–358. https://doi.org/10.1080/10611932.2018.1510688

87. Zhang, J. H., Chu, Y. X., & Lin, C. D. (2008). The structure of the creative teaching behavior evaluation scale for teachers. *Psychological Development and Education*, 2008(3), 107–112. https://devpsy.bnu.edu.cn/CN/abstract/abstract461.shtml

88. Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43, 115-135. https://doi.org/10.1007/s11747-014-0403-8

89. Woo, B., & Kim, Y. G. (2002). Breaking the myths of rewards: An exploratory study of attitudes about knowledge sharing. *Information Resources Management Journal, 15*(2), 1111–1125. https://doi.org/10.4018/irmj.2002040102

90. Lundberg, S. (2020). Educational gender gaps. *Southern economic journal, 87*(2), 416-439. https://doi.org/10.1002/soej.12460

91. Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52(1), 1-26. https://doi.org/10.1146/annurev.psych.52.1.1

92. Bos-Nehles, A. C., & Veenendaal, A. A. (2019). Perceptions of HR practices and innovative work behavior: The moderating effect of an innovative climate. *The International Journal of Human Resource Management, 30*(18), 2661–2683. https://www.tandfonline.com/doi/pdf/10.1080/09585192.2017.1380680

93. Loogma, K., Kruusvall, J., & Ümarik, M. (2012). E-learning as innovation: Exploring innovativeness of the VET teachers' community in Estonia. *Computers & Education, 58*(2), 808–817. https://www.sciencedirect.com/science/article/abs/pii/S0360131511002491

94. Yang, S. C., & Huang, Y. F. (2008). A study of high school English teachers' behavior, concerns and beliefs in integrating information technology into English instruction. *Computers in Human Behavior, 24*(3), 1085–1103. https://doi.org/10.1016/j.chb.2007.03.009

95. Dong, Y., & Liu, L. (2024). How the scientific research evaluation system affects university teachers' proactive innovative behavior: Based on a survey of teachers from 29 "Double First-Class" universities. *Fudan Education Forum*, (1), 85–93. https://qikan.cqvip.com/Qikan/Article/Detail?id=7111807138

96. Zheng, J. Y., & Lü, W. G. (2022). The impact of knowledge sharing on the innovative behavior of university PE teachers under psychological empowerment. *Journal of Physical Education*, (2), 86–92. https://qikan.cqvip.com/Qikan/Article/Detail?id=7106859244

97. Chang, C. M., Hsieh, H. H., Chou, Y. H., & Huang, H. C. (2021). The relationship between physical education teachers' perceptions of principals' transformational leadership and creative teaching behavior at junior and senior high schools: A cross-level moderating effect on innovative school climates. *Sustainability, 13*(15), 8184. https://doi.org/10.3390/su13158184

98. Kiral, E., & Suçiçegi, A. (2017). The relationship between teachers' perception of school principals' instructional leadership and organisational commitment level. *International Journal of Psycho-Educational Sciences, 6*(1), 95–109. https://eric.ed.gov/?id=EJ1254691

99. Ghavifekr, S., Ibrahim, M. S., Chellapan, K., Sukumaran, K., & Subramaniam, A. (2017). Instructional leadership practices of principal in vocational and technical college: Teachers' perception. MOJEM: Malaysian Online Journal of Educational Management, 3(1), 48–67. https://malindojournal.um.edu.my/index.php/MOJEM/article/view/6094

100. Sarikaya, N., & Erdogan, Ç. (2016). Relationship between the instructional leadership behaviors of high school principals and teachers' organizational commitment. *Journal of Education and Practice, 7*(3), 72–82. https://eric.ed.gov/?id=EJ1089789

101. Groenewald, E., Kilag, O. K., Cabuenas, M. C., Camangyan, J., Abapo, J. M., & Abendan, C. F. (2023). The influence of principals' instructional leadership on the professional performance of teachers. *Excellencia: International Multi-disciplinary Journal of Education (2994-9521), 1*(6), 433–443. https://www.researchgate.net/publication/376784755

102. Edmondson, A. C. (2018). *The fearless organization: Creating psychological safety in the workplace for learning, innovation, and growth.* John Wiley & Sons.

103. Berkovich, I., & Hassan, T. (2024). Principals' digital instructional leadership during the pandemic: Impact on teachers' intrinsic motivation and students' learning. *Educational Management Administration & Leadership, 52*(4), 934–954. https://journals-sagepub-com.1458.top/doi/pdf/10.1177/17411432221113411

104. Lassiter, C., Fisher, D., Frey, N., & Smith, D. (2022). *How leadership works: A playbook for instructional leaders.* Corwin Press. https://books.google.co.th/books?hl=zh-CN&lr=&id=Ma9gEAAAQBAJ&oi=fnd&pg=PT9&dq=How+leadership+works:+A+playbook+for+inst&ots=hm

1hyuuHeB&sig=zBKmnFxg1-sBV6UyfAp8WqS0G4U&redir_esc=y#v=onepage&q=How%20leadership%20works%3A%20A%20playbook%20for%20inst&f=false

105. Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, 33(4), 692-724.

106. Shmeleva, E. A., Kislyakov, P. A., Luneva, L. F., & Maltseva, L. D. (2015). Psychological factors of the readiness of teachers to ensure social security in the educational environment. *Psychology in Russia, 8*(1), 74. http://doi.org.10.11621/pir.2015.0107

107. Xiao, Z. X., & Lou, J. J. (2016). A study on the mechanism of the influence of organizational culture and psychological ownership on knowledge sharing in knowledge-based teams. *Journal of Agricultural Library and Information Science*, 28(4), 13–16. https://qikan.cqvip.com/Qikan/Article/Detail?id=668453417

108. Yang, S., & Yu, K. (2019). The impact of organizational trust on teachers' knowledge sharing: The mediating role of psychological safety and the moderating role of communication satisfaction. *Educational Research and Experiment*, (2), 39–45. https://qikan.cqvip.com/Qikan/Article/Detail?id=7001981120

109. Song, F., & Zhang, Z. S. (2022). Pressure, compensation mechanism and knowledge sharing: An analysis based on evolutionary game theory. *Operations Research and Management*, 31(8), 15. https://qikan.cqvip.com/Qikan/Article/Detail?id=7107949091&from=Qikan_Search_Index

110. Zhang, D. Q. (2018). Mechanisms and strategies for teachers' knowledge sharing. *Journal of Chinese Education*, 2018(2), 95–98. https://qikan.cqvip.com/Qikan/Article/Detail?id=674473086

111. Li, Y. (2015). Reform of laboratory safety management systems to meet the needs of innovative experimental teaching. *Research & Exploration in Laboratory*, 34(11). https://qikan.cqvip.com/Qikan/Article/Detail?id=667611262&from=Qikan_Search_Index

112. Xiong, H. Q. (2020). Promoting the integration and innovation of theoretical and experimental teaching through virtual simulation experimental teaching. *Experimental Technology & Management*, 37(5). https://qikan.cqvip.com/Qikan/Article/Detail?id=7102219809

113. Ai, Q., Liu, C., & You, L. (2019). Privacy protection and countermeasures for academic users accessing foreign academic databases. *Library and Information Service*, 63(10), 12–20. https://qikan.cqvip.com/Qikan/Article/Detail?id=7001882393

114. Hua, X. Y. (2015). Analysis and countermeasures of the current situation of primary and secondary school teachers' utilization of online literature resources. *Teaching and Management: Theory Edition*, (1), 29–31. https://qikan.cqvip.com/Qikan/Article/Detail?id=663556489&from=Qikan_Search_Index

115. Zhou, H. L. (2022). A brief discussion on sample space in probability statistics. *Mathematics Learning and Research*, (24), 11–13. https://qikan.cqvip.com/Qikan/Article/Detail?id=7108019611