Journal of

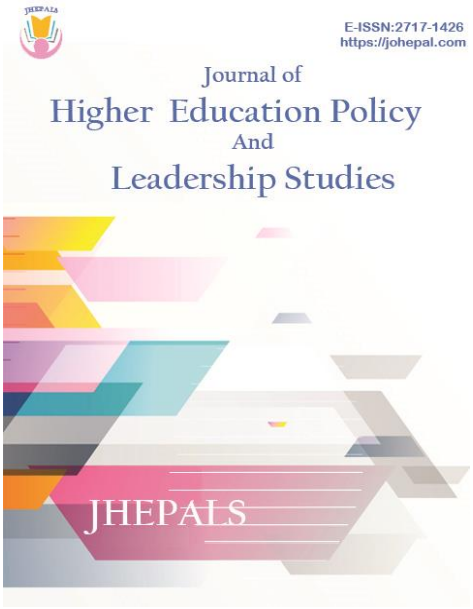
Higher Education Policy

And

Leadership Studies

JHEPALS (E-ISSN: 2717-1426)

https://johepal.com



Identifying Dimensions of Innovative Student Leadership in Chinese Higher Education: An Exploratory Factor Analysis

Weiling Wang
School of Biomedical Engineering, Guangzhou Xinhua University, Guangzhou, CHINA
Email: wangweiling6320@xhsysu.edu.cn
https://orcid.org/0009-0009-5413-979X

Ziyun Song
School of Foreign Languages and Trade, Guangdong Polytechnic of Water Resources and Electric Engineering, Guangzhou, CHINA
Email: songzy@gdsdxy.edu.cn
https://orcid.org/0009-0002-5653-6106

Article Received	Article Accepted	Published Online
2025/07/23	**2025/09/26**	**2025/12/31**

Cite article as:

Wang, W., & Song, Z. (2025). Identifying dimensions of innovative student leadership in Chinese higher education: An exploratory factor analysis. *Journal of Higher Education Policy and Leadership Studies*, *6*(4), 112-131. https://dx.doi.org/10.61882/johepal.6.4.112

[DOI: 10.61882/johepal.6.4.112]

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Journal of Higher Education Policy And Leadership Studies (JHEPALS)

E-ISSN: 2717-1426
Volume: 6 Issue: 4
pp. 112-131
DOI:
10.61882/johepal.6.4.112

Weiling Wang
Ziyun Song *

Abstract

This study explores the key factors influencing students' innovative leadership within the unique institutional structure of Chinese higher education. A five-factor model was developed encompassing perceived organizational support, student leadership, and three dimensions of innovation capacity: intrapersonal resilience, social collaboration, and cognitive innovation. The instrument underwent rigorous validation, including expert review, content validity analysis, exploratory factor analysis, and reliability testing. Results confirmed high internal consistency and structural clarity, with the innovation capacity dimensions achieving full expert consensus. The findings emphasize the importance of both external organizational support and internal psychological traits in fostering innovative leadership. In particular, the study highlights the role of emotional and instrumental support in Party-led university structures, where genuine student participation and inclusive leadership development remain limited. By validating a culturally adapted measurement tool, this research contributes to a deeper understanding of how innovation and leadership can be cultivated in Chinese universities, offering practical guidance for institutional reform and theoretical support for future studies.

Keywords: Cognitive Innovation; Organizational Support; Social Collaboration; Innovation Capacity; Chinese Higher Education; Intrapersonal Resilience

* **Corresponding author's email:** songzy@gdsdxy.edu.cn

[DOI: 10.61882/johepal.6.4.112]

Introduction

Higher education is currently facing profound challenges brought about by technological innovation, social transformation, and accelerating globalization. Against this backdrop, cultivating students with innovative leadership has become increasingly important (Strobel et al., 2025). Existing research suggests that creativity is not merely a natural talent but a higher-order thinking skill that can be nurtured through specific cognitive strategies and emotional attitudes (Mou, 2024; Redifer et al., 2021). Unlike traditional problem-solving approaches, creative thinking emphasizes the novelty and practical value of ideas, making it a complex cognitive task (Redifer et al., 2021). In the context of 21st-century education, creative thinking is considered a "super skill" essential for adapting to a rapidly changing world (Avcı & Yildiz Durak, 2023) and has been incorporated into core curriculum standards in many countries (Lin & Wang, 2021). International organizations such as the OECD have also highlighted that cultivating creativity not only enhances national competitiveness but also contributes to individual self-fulfillment and well-being (Li & Huang, 2024).

However, the development of student creativity is not the result of a single factor but rather the outcome of multiple internal elements such as self-efficacy, psychological expectations, and positive traits (Li & Huang, 2024). Self-efficacy plays a crucial role in the creative process, as students with higher levels of self-efficacy tend to demonstrate greater task competence and engage more easily in creative tasks (Redifer et al., 2021; Zeng, 2025). Moreover, the development of student creativity is significantly influenced by the organizational environment, in which Perceived Organizational Support (POS) plays a vital role. POS not only directly enhances individual innovation performance but also indirectly fosters creative behaviors by boosting engagement and organizational identification (Huang et al., 2025; Yang & Zhou, 2022). In the Chinese context, POS is often understood as a multidimensional construct including emotional support, instrumental assistance, supervisor support, and peer support, which better aligns with the structure of university organizations in China (Li et al., 2023). Leadership itself is also widely acknowledged by students as an ability that can be cultivated through educational practices, rather than being an innate trait (Wright et al., 2025). Therefore, this study focuses on the internal mechanisms and external organizational factors that contribute to the cultivation of innovative leadership in higher education, providing theoretical and practical guidance for developing future innovative leaders in universities.

Despite the valuable theoretical insights from previous studies, the organizational and management model of Chinese universities is distinctive, featuring a dual-track system in which both the Communist Party and administrative structures operate concurrently (Liu & Yan, 2019). Student management is primarily led by Party organizations (Cai et al., 2023). Under this system, student cadres tend to perform functions related to coordination and obedience rather than genuine self-governance, which may limit students' capacity for independent innovation and critical thinking (Cai et al., 2023). In addition, POS scores in Chinese universities tend to be low, especially in terms of emotional support, further hindering students' psychological safety and creative confidence when facing challenging tasks (Li & Yang, 2025; Li et al., 2023; Pu et al., 2024). More critically, current student leadership development models typically focus only on a small group of student cadres,

[DOI: 10.61882/johepal.6.4.112]

while most ordinary students have limited access to structured and inclusive leadership training opportunities (Bai et al., 2022).

Furthermore, some "student partnership" initiatives implemented by universities remain superficial, failing to grant students real participation in decision-making or meaningful leadership experiences (Patrick, 2025; Welton et al., 2022). This performative form of participation may even undermine students' creative engagement and organizational trust (Li & Yang, 2025). As such, there is an urgent need for Chinese universities to explore locally adapted mechanisms for cultivating innovative leadership, especially within Party-led management structures. The focus should be on how to enhance students' creativity and leadership through effective organizational support and psychological empowerment. This study aims to investigate the pathways to fostering innovative leadership within the unique institutional and administrative context of Chinese higher education, addressing existing theoretical gaps and providing actionable recommendations for institutional practice.

The specific objective of this study is to identify the latent dimensions influencing students' innovative leadership through Exploratory Factor Analysis (EFA). The research is based on data collected from Chinese university students. Theoretically, this study seeks to deepen the understanding of the structural composition of innovative leadership, particularly in the context of Chinese university governance. Practically, the findings aim to offer theoretical support and practical guidance to Party organizations in universities to construct supportive organizational environments that enhance student creativity and leadership. Previous studies have shown that students with a growth mindset and high self-efficacy can significantly improve their creative performance in supportive educational environments (Zeng, 2025), and that effective stimulation of students' extrinsic motivation and exploratory behavior can improve the quality of learning (Avcı & Yildiz Durak, 2023). The more organizational support students receive, the stronger their organizational identification and willingness to reciprocate (Li & Yang, 2025; Li et al., 2023). Therefore, this study will clarify the specific pathways through which POS influences student innovative leadership, offering concrete strategies for institutional development, communication mechanisms, and emotional support in Party-led environments (Bardhoshi et al., 2023; Uluturk, 2024).

Literature Review

Student Leadership

Student leadership is widely regarded as a key mechanism for cultivating students' comprehensive competencies in Chinese higher education (Niu et al., 2025). A growing body of research suggests that holding leadership roles significantly enhances multiple core skills and facilitates career development. Based on a five-year panel survey, Cui et al. (2022) found that student leadership experience positively influenced graduates' starting salaries, particularly by improving learning ability, problem-solving capacity, and interpersonal skills. Bai et al. (2022), drawing on qualitative interviews with vocational college students and employers in Beijing, further confirmed this mechanism. However, not all studies concur with the fact that student leadership experience unequivocally improves employment outcomes. Cai et al. (2023), using a field experiment in Chinese universities, found that the

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employability value of student leadership is highly context-dependent, varying across academic disciplines, job types, firm sizes, and leadership levels. Specifically, graduates from science and engineering disciplines, those who held higher-level leadership positions, and applicants to small or mid-sized enterprises were more likely to benefit from their leadership experience. Niu et al. (2025) proposed the "sequential engagement theory" to explain the leadership trajectories of rural university students, who often adopt a strategy of prioritizing academics before engaging in social and leadership roles. This phased involvement allows them to balance academic demands with social integration and gradually build self-efficacy in competitive educational settings.

From an institutional perspective, student leadership cultivation in Chinese universities faces structural challenges. While student leadership programs often succeed in developing organizational, risk management, and resource coordination skills, they may inadvertently overemphasize administrative compliance and suppress students' autonomy and critical thinking Cai et al. (2023). Welton et al. (2022) also noted that hierarchical decision-making structures in universities frequently marginalize student voices and limit their access to genuine structural power. As such, institutions should prioritize mechanisms that promote student agency and embed student leadership within processes that offer real influence. This requires moving beyond symbolic participation and ensuring that student leadership development becomes an integral part of holistic student growth.

Perceived Organizational Support

Perceived Organizational Support (POS) refers to individuals' general belief regarding the extent to which their organization values their contributions and cares about their well-being and development (Huang et al., 2025). Rooted in Social Exchange Theory, POS is regarded as a key psychological construct that guides employees' decisions about whether to reciprocate organizational investments with emotional commitment, behavioral engagement, or creative performance (Li et al., 2023). In recent years, POS has evolved beyond its original workplace context and has been widely applied to educational, healthcare, and technological settings as a predictor of diverse outcomes including work engagement, retention intention, creativity, and organizational loyalty.(Fan et al., 2022; Pu et al., 2024; Uluturk, 2024)

Empirical research has identified multiple psychological pathways through which POS exerts its influence. For instance, Uluturk (2024) demonstrated that POS enhances proactive innovation behavior by satisfying individuals' basic psychological needs for autonomy, competence, and relatedness. Similarly, Huang et al. (2025) found that POS strengthens creative performance by fostering affective commitment and innovative self-efficacy. From a psychological resilience perspective, Pu et al. (2024) revealed that POS acts as a critical mediator linking resilience to intention to stay, accounting for over 70% of the total effect. Notably, these effects are not automatic; their magnitude and direction are shaped by contextual factors such as leadership communication, organizational justice, and emotional authenticity. Li and Yang (2025) warned against the "boomerang effect" that may occur when organizational support is perceived as performative or misaligned with employees' expectations. Their dual-mechanism model highlights the importance of both the quantity and quality of support in achieving positive organizational outcomes. In educational contexts, particularly in Chinese universities undergoing party-led organizational

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transformation, POS manifests in both institutional arrangements and the relational climate created by advisors and student leaders (Huang et al., 2025; Uluturk, 2024).

Innovation Capacities & Creative Self-Efficacy

In the rapidly evolving context of higher education, the cultivation of innovation capacities and creative self-efficacy (CSE) has become a central focus in educational research. Innovation capacities, defined as the cognitive, social, and behavioral traits that enable individuals to generate, adapt, and implement novel ideas, are widely regarded as essential for academic engagement and real-world problem-solving (Avcı & Yildiz Durak, 2023). Studies indicate that innovation capacities can be cultivated through intentional course design and supportive environments, as evidenced by Gu et al. (2023), who found that a STEAM-based program integrating theory and interdisciplinary projects significantly improved students' creative performance and confidence.

Creative self-efficacy, as defined by Tierney and Farmer (2002), refers to individuals' belief in their ability to produce and express creative ideas in the face of complex tasks, and has been consistently validated as a key psychological predictor of innovative performance. Redifer et al. (2021) found that individuals with high CSE experienced reduced cognitive load during divergent thinking tasks, thereby generating more ideas. Similarly, Mou (2024) reported that creative thinking training significantly improved both CSE and project performance among design students, highlighting CSE's role in both affective regulation and behavioral outcomes.

Recent research underscores that CSE does not develop in isolation but emerges from the interplay between individual dispositions and contextual factors. (Zeng, 2025) highlighted that both growth mindset and a supportive school environment significantly contribute to fostering CSE and creative thinking, provided they are aligned with psychologically engaging pedagogical strategies. Lin and Wang (2021) further demonstrated that learning environments enriched by immersive technologies like virtual reality can enhance students' creative confidence, particularly in idea generation, while also illustrating the contextual sensitivity and multidimensional nature of CSE. Expanding on the internal dimension, Li and Huang (2024) emphasized that positive psychological traits such as hope, satisfaction, and optimism function as psychological catalysts that indirectly enhance creativity via strengthened self-efficacy. Together, these perspectives suggest that fostering CSE requires a holistic approach that simultaneously leverages structural, pedagogical, and psychological supports.

Research Methodology

Instrument Development

As shown in Table 1, the questionnaire used in this study was developed by adopting and adapting items from well-established instruments to fit the linguistic and contextual characteristics of Chinese university students. The Perceived Organizational Support (POS) items were adapted from the classic scale by Eisenberger (1986), which measures the extent to which individuals feel that the organization values their contributions and cares about their well-being. The Student Leadership dimension was adapted from Posner (2004) Student Leadership Challenge Scale, which is based on the Five Practices of Exemplary

[DOI: 10.61882/johepal.6.4.112]

Leadership model. The Innovation Capacities scale was adapted from Selznick; and Mayhew (2018), consisting of three sub-dimensions: Cognitive Innovation, Social Collaboration, and Intrapersonal Resilience. These sub-dimensions assess students' internal motivation and resilience, social collaboration, and cognitive approaches to innovation, respectively. Lastly, to enhance accuracy and understanding among respondents, professional translators employed a back-to-back translation approach from English to Chinese for these instruments.

Table 1.
Original and Revised Items of the Instrument

Item	Original statement	Revised statement
	Perceived Organizational Support	
POS1	The organization values my contribution to its well-being.	The organization recognizes and appreciates my contributions.
POS2	The organization fails to appreciate any extra effort from me. (R)	When I voluntarily take on tasks beyond the basic requirements of the organization (e.g., assisting others or organizing additional activities), the organization gives me positive recognition.
POS3	The organization would ignore any complaint from me. (R)	The student organization takes my suggestions or complaints seriously.
POS4	The organization disregards my best interests when it makes decisions that affect me. (R)	When making decisions related to my personal growth and development, the organization takes into account my actual thoughts and individual needs.
POS5	Help is available from the organization when I have a problem.	When I encounter confusion in my thoughts or studies, the counselor or organization members take the initiative to provide guidance and support.
POS6	The organization would fail to understand my absence due to a personal problem. (R)	The counselor or organization understands when I am unable to participate in activities due to personal reasons.
POS7	The organization would forgive an honest mistake on my part.	If I make an unintentional mistake, the student organization shows understanding.
POS8	Even if I did the best job possible, the organization would fail to notice. (R)	My efforts are recognized when I try my best to complete tasks.
POS9	If given the opportunity, the organization would take advantage of me. (R)	The organization ensures fairness in task allocation and evaluation and respects and encourages each student's development.
POS10	If I decided to quit, the organization would try to persuade me to stay.	The organization communicates with me to strengthen my confidence and goals when I feel uncertain or consider withdrawing.
POS11	The organization takes pride in my accomplishments at work.	Adopted without modification
POS12	The organization would understand if I were unable to finish a task on time.	Adopted without modification
	Student Leadership	

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SL1	I set a personal example of what I expect from others.	Adopted without modification
SL2	I seek out challenging opportunities that test my own skills and abilities.	Adopted without modification
SL3	I praise people for a job well done.	Adopted without modification
SL4	I actively listen to diverse points of view.	I am willing to listen to different opinions and perspectives.
SL5	I make it a point to let people know about my confidence in their abilities.	Adopted without modification
SL6	I appeal to others to share an exciting dream of the future.	Adopted without modification
SL7	I treat others with dignity and respect.	Adopted without modification
SL8	I support the decisions that people make on their own.	Adopted without modification
SL9	I am clear about my philosophy of leadership.	I have a clear understanding of what makes a good leader.
SL10	I experiment and take risks, even when there is a chance of failure.	Adopted without modification
	Intrapersonal Resilience	
Int1	Persist towards achieving long-term goals, even after experiencing setbacks	I keep working toward my long-term goals despite setbacks.
Int2	Pursue a goal even after someone has told me it will be difficult to achieve	Even if others believe a goal is difficult to achieve, I am willing to take on the challenge.
Int3	Sustain interest in a project that has no clear end date	I stay motivated and focused even without a clear project deadline.
Int4	Initiate actions that positively change a situation for others	I take the initiative to actively improve my own situation or that of others.
Int5	Come up with ideas that will help make the world a better place	I offer ideas that help improve the current situation.
Int6	Gather information from multiple sources to achieve one goal	I actively collect information from various sources to reach my goals.
Int7	Others have told me that I am a good problem solver	Adopted without modification
Int8	I can come up with an original concept that will benefit myself and others	Adopted without modification
Int9	I see myself as being a creative thinker	Adopted without modification
	Social Collaboration	
Soc1	Start conversations with others whom I do not know very well	I am willing to initiate conversations with people I am not familiar with.
Soc2	Turn a new relationship into a closer friendship	I can develop newly formed relationships into deeper friendships.
Soc3	Clearly expressing my vision for solving a problem to others	I can clearly articulate my ideas and approaches to problem-solving.

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Soc4	Convincing someone that my way is the right way to accomplish a given task	I can persuade others to adopt my approach to completing tasks.
Soc5	Persuading others to support my point of view	I am good at getting others to agree with my opinions.
Soc6	Explaining my rationale for making a decision to others	I can clearly explain the reasons and rationale behind my decisions.
Soc7	Working as part of a group with people who are of a different race/ethnicity than my own	I can collaborate effectively with people from different cultural backgrounds to complete tasks.
Soc8	Working on a team with people whom I am meeting for the first time	I can quickly form teams and cooperate smoothly with people I meet for the first time.
Soc9	Working as part of a group with people who have different skill sets from my own	I work well with people from different fields.
	Cognitive Innovation	
Cog1	I am able to generate original ideas	Adopted without modification
Cog2	I like to develop new strategies for helping ideas become realities	Adopted without modification
Cog3	I like to experiment with different approaches to completing the same task	Adopted without modification
Cog4	Acquiring resources necessary to realize a new opportunity	I can acquire the resources needed to realize new opportunities.
Cog5	Creating an entity to take advantage of new opportunities	I can form a team to take advantage of new opportunities.
Cog6	Challenge a classmate's suggestions for how to solve a problem	I am willing to express different opinions when others propose solutions.
Cog7	Express my opinion, even if I am unsure that others share my viewpoint	Adopted without modification
Cog8	Challenge a teacher's suggestions for how to solve a problem	I share my own ideas even when they differ from the teacher's.
Cog9	Suggest improvements to a classmate's idea	I offer suggestions to improve my classmates' ideas.

Content Validity Index

This study followed the six-step content validation framework proposed by Yusoff (2019), which includes: drafting a content validation form, selecting qualified experts, conducting the validation process, reviewing items and domains, rating items, and calculating the Content Validity Index (CVI).

A panel of five experts was invited, comprising senior student affairs administrators and educators from both vocational and undergraduate institutions in China. All experts held at least an associate professorship and had extensive experience in student management. They were provided with a validation form based on Davis (1992) 4-point relevance scale, along with a detailed explanation of the construct definitions and measurement objectives. Experts assessed each item for clarity and relevance and were encouraged to provide written feedback. The validation process was conducted asynchronously via email and messaging platforms, ensuring clarity and reducing logistical constraints (Yusoff, 2019).

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Following Davis (1992) scoring convention, items rated 3 or 4 were assigned a value of 1 (relevant), while items rated 1 or 2 were assigned 0 (not relevant). The Item-level CVI (I-CVI) was calculated as the proportion of experts rating an item as relevant. The Scale-level CVI (S-CVI) was computed using both average (S-CVI/Ave) and universal agreement (S-CVI/UA) methods (Polit & Beck, 2006). Based on widely accepted guidelines (Polit et al., 2007; Lynn, 1986), items with I-CVI values below 0.80 were eliminated, and those below 1.00 were revised according to expert suggestions.

Exploratory Factor Analysis

To identify the latent structure underlying the factors shaping students' innovative leadership, exploratory factor analysis (EFA) was conducted following the recommended procedures by Hair et al. (2019). A structured questionnaire was developed and distributed using a stratified cluster sampling strategy. One vocational college and one undergraduate university in China were selected, and the survey was administered online via Wenjuanxing, a Chinese online survey platform. A total of 390 questionnaires were distributed, and 330 valid responses were retained for analysis after screening for completeness and consistency.

EFA was conducted to uncover the underlying factor structure of the constructs using principal component analysis with varimax rotation (Hair et al., 2019). Factors with eigenvalues greater than 1.0 were retained, and items with loadings above 0.60 and no substantial cross-loadings were considered acceptable. The adequacy of the sample for factor analysis was evaluated using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity, with established thresholds of KMO above 0.90 and a significant p-value indicating suitability (Hair et al., 2019). Factor retention was guided by both statistical and conceptual criteria to ensure interpretability.

Internal consistency was assessed using Cronbach's alpha and composite reliability, with values above 0.70 considered acceptable (Fornell & Larcker, 1981). Convergent validity was evaluated through average variance extracted, with a threshold of 0.50 indicating adequate convergence (Fornell & Larcker, 1981). Discriminant validity was assessed by comparing the square roots of the AVEs with inter-construct correlations, ensuring that each construct shared more variance with its own items than with other constructs.

Results

Content Validity Results

To ensure that the questionnaire accurately reflected the intended constructs, five experts with backgrounds in higher education management and student affairs were invited to evaluate the content validity of the preliminary instrument. A 4-point relevance scale was used following Davis (1992), and item-level content validity index (I-CVI) as well as scale-level indices (S-CVI/Ave and S-CVI/UA) were calculated according to Polit and Beck (2006). An I-CVI of 0.80 or above was considered the threshold for acceptability (Davis, 1992). The results are shown in Table 2.

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Table 2.
Content Validity Index (CVI) Ratings for Each Item Across Five Dimensions

Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Experts in Agreement	I-CVI	UA
POS1	1	1	0	1	1	4	0.8	0
POS2	1	1	1	0	1	4	0.8	0
POS3	1	1	0	1	1	4	0.8	0
POS4	1	0	0	1	1	3	0.6	0
POS5	1	0	0	1	1	3	0.6	0
POS6	1	0	0	1	1	3	0.6	0
POS7	1	0	0	0	1	2	0.4	0
POS8	1	1	1	1	1	5	1	1
POS9	1	0	0	1	1	3	0.6	0
POS10	1	0	0	1	1	3	0.6	0
POS11	1	1	1	1	1	5	1	1
POS12	1	0	1	1	1	4	0.8	0
						S-CVI/Ave	0.717	
						S-CVI/UA	0.167	
Proportion relevance: Average proportion of items judged as relevant across the five experts							0.717	
Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Experts in Agreement	I-CVI	UA
SL1	1	1	1	1	1	5	1	1
SL2	1	1	1	1	1	5	1	1
SL3	1	0	1	1	1	4	0.8	0
SL4	1	1	1	1	1	5	1	1
SL5	1	0	1	1	1	4	0.8	0
SL6	1	1	1	1	1	5	1	1
SL7	1	1	1	1	1	5	1	1
SL8	1	0	1	1	1	4	0.8	0
SL9	1	0	0	1	1	3	0.6	0
SL10	1	1	1	1	1	5	1	1
						S-CVI/Ave	0.9	
						S-CVI/UA	0.6	
Proportion relevance: Average proportion of items judged as relevant across the five experts							0.9	
Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Experts in Agreement	I-CVI	UA
Int1	1	1	1	1	1	5	1	1
Int2	1	1	1	1	1	5	1	1
Int3	1	1	1	1	1	5	1	1

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Int4	1	1	1	1	1	5	1	1
Int5	1	1	1	1	1	5	1	1
Int6	1	1	1	1	1	5	1	1
Int7	1	1	1	1	1	5	1	1
Int8	1	1	1	1	1	5	1	1
Int9	1	1	1	1	1	5	1	1
						S-CVI/Ave	1	
						S-CVI/UA	1	
Proportion relevance: Average proportion of items judged as relevant across the five experts							1	
Item	**Expert 1**	**Expert 2**	**Expert 3**	**Expert 4**	**Expert 5**	**Experts in Agreement**	**I-CVI**	**UA**
Soc1	1	1	1	1	1	5	1	1
Soc2	1	1	1	1	1	5	1	1
Soc3	1	1	1	1	1	5	1	1
Soc4	1	1	1	1	1	5	1	1
Soc5	1	1	1	1	1	5	1	1
Soc6	1	1	1	1	1	5	1	1
Soc7	1	1	1	1	1	5	1	1
Soc8	1	1	1	1	1	5	1	1
Soc9	1	1	1	1	1	5	1	1
						S-CVI/Ave	1	
						S-CVI/UA	1	
Proportion relevance: Average proportion of items judged as relevant across the five experts							1	
Item	**Expert 1**	**Expert 2**	**Expert 3**	**Expert 4**	**Expert 5**	**Experts in Agreement**	**I-CVI**	**UA**
Cog1	1	1	1	1	1	5	1	1
Cog2	1	1	1	1	1	5	1	1
Cog3	1	1	1	1	1	5	1	1
Cog4	1	1	1	1	1	5	1	1
Cog5	1	1	1	1	1	5	1	1
Cog6	1	1	1	1	1	5	1	1
Cog7	1	1	1	1	1	5	1	1
Cog8	1	1	1	1	1	5	1	1
Cog9	1	1	1	1	1	5	1	1
						S-CVI/Ave	1	
						S-CVI/UA	1	
Proportion relevance: Average proportion of items judged as relevant across the five experts							1	

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In the Perceived Organizational Support (POS) dimension, 12 items were evaluated. Two items (POS8 and POS11) achieved I-CVI of 1.00 and were retained without modification. POS7, with an I-CVI of only 0.40, was eliminated. Other items with I-CVI of 0.80 were revised based on detailed feedback provided by the expert panel. The revised items were then re-evaluated by the same experts, and all received I-CVI of 1.00, confirming their improved clarity and relevance.

In the Student Leadership dimension, six of the ten items initially achieved I-CVI of 1.00. The remaining four items with I-CVI values of 0.80 or 0.60 were also revised and, upon re-evaluation, received full agreement from the experts.

The three sub-dimensions of Innovation Capacities: Intrapersonal, Social, and Cognitive, showed excellent initial content validity. All 27 items in these dimensions received I-CVI of 1.00 from the outset, and both S-CVI/Ave and S-CVI/UA were equal to 1.00, indicating strong conceptual clarity and expert consensus.

Respondent Demographics

As shown in Table 3, a total of 330 valid responses were included in the analysis. Among the participants, 56.10% were male (n = 185) and 43.90% were female (n = 145). In terms of age, the majority were 19 years old (46.40%), followed by 20 years old (29.40%), 18 years old (14.60%), 21 years old (7.60%), and 22 years or older (2.10%). Regarding extracurricular involvement, 77.60% of students (n = 256) reported participation in student clubs or volunteer activities, while 22.40% (n = 74) reported no such involvement. In addition, 40.90% of respondents (n = 135) had served as student leaders or class cadres, whereas 59.10% (n = 195) had no such leadership experience. Only a small proportion of participants (5.80%, n = 19) identified as current or probationary members of the Communist Party of China, while the majority (94.20%, n = 311) were non-members.

Table 3.
Demographic of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	185	56.10%
	Female	145	43.90%
Age	18 years	48	14.60%
	19 years	153	46.40%
	20 years	97	29.40%
	21 years	25	7.60%
	22 years or above	7	2.10%
Participation in student clubs or volunteering activities	Yes	256	77.60%
	No	74	22.40%
Experience serving as a student leader or class cadre	Yes	135	40.90%
	No	195	59.10%
Communist Party membership (including probationary)	Yes	19	5.80%
	No	311	94.20%

[DOI: 10.61882/johepal.6.4.112]

Exploratory Factor Analysis

Exploratory factor analysis (EFA) was conducted using principal component analysis with varimax rotation to explore the underlying factor structure of the instrument. The Kaiser–Meyer–Olkin (KMO) value was 0.949, indicating excellent sampling adequacy. Five components with eigenvalues greater than 1.0 were extracted, accounting for 72.08% of the total variance. Items with factor loadings below 0.50 or cross-loadings greater than 0.40 were removed to ensure the clarity and discriminant validity of the factor structure (Hair et al., 2019).

Component 1 reflected Perceived Organizational Support (POS) and included 11 items with strong loadings ranging from 0.726 to 0.867. Component 2, labeled Cognitive Innovation, comprised Cog3 to Cog9 (loadings: 0.653–0.789). Component 3 captured Social Collaboration, including Soc2 to Soc7 (loadings: 0.577–0.816). Component 4 represented Student Leadership, containing SL3 to SL8 (loadings: 0.686–0.784). Component 5, labeled Intrapersonal Resilience, included Int6 to Int9 (loadings: 0.606–0.710), as shown in Table 4.

Table 4.
Exploratory Factor Analysis Results

Item	Component				
	1	2	3	4	5
POS1	0.726				
POS2	0.797				
POS3	0.854				
POS4	0.867				
POS5	0.857				
POS6	0.865				
POS8	0.857				
POS9	0.862				
POS10	0.838				
POS11	0.768				
POS12	0.765				
SL3				0.737	
SL4				0.784	
SL5				0.731	
SL6				0.754	
SL7				0.722	
SL8				0.686	
Int6					0.606
Int7					0.71
Int8					0.685
Int9					0.664
Soc2			0.708		
Soc3			0.731		

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Soc4			0.816		
Soc5			0.695		
Soc6			0.734		
Soc7			0.577		
Cog3		0.678			
Cog4		0.723			
Cog5		0.754			
Cog6		0.789			
Cog7		0.697			
Cog8		0.705			
Cog9		0.653			
Total	8.341	4.687	4.418	4.383	2.678
% of Variance	24.532	13.786	12.995	12.89	7.877
Cumulative %	24.532	38.318	51.313	64.203	72.08
KMO = 0.949					

Reliability and Validity

To assess the internal consistency and construct validity of the five-factor structure, several reliability and validity indicators were examined, as shown in Table 5. Composite reliability (CR) values for all constructs ranged from 0.76 to 0.97, exceeding the recommended threshold of 0.70 (Hair et al., 2019). Cronbach's alpha values ranged from 0.884 to 0.964, indicating high internal consistency across all dimensions.

Convergent validity was assessed using the average variance extracted (AVE), with all constructs exceeding the 0.50 threshold except for the Intrapersonal dimension (AVE = 0.45), which was slightly below the cutoff but retained due to strong theoretical and empirical justification. The square roots of the AVEs (presented on the diagonal) were all greater than the inter-construct correlations, supporting discriminant validity (Fornell & Larcker, 1981). Significant positive correlations were observed among all five dimensions ($p < .01$), with the strongest association between Intrapersonal and Social ($r = .716$), and the weakest between POS and Cognitive ($r = .301$). These results indicate that while the five constructs are interrelated, they maintain sufficient discriminant properties to be treated as distinct factors.

Table 5.
Construct Validity and Internal Consistency

	POS	SL	Int	Soc	Cog	CR	AVE	Cronbach's α
POS	0.88	.569**	.414**	.399**	.301**	0.97	0.77	0.964
SL	.569**	0.73	.635**	.529**	.480**	0.88	0.54	0.918
Int	.414**	.635**	0.67	.716**	.577**	0.76	0.45	0.922
Soc	.399**	.529**	.716**	0.71	.676**	0.86	0.51	0.913
Cog	.301**	.480**	.577**	.676**	0.71	0.88	0.51	0.884

Note: The values on the diagonal are the square roots of the average variance extracted (AVE)

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Discussion

This study aimed to explore the critical factors shaping students' innovative leadership in Chinese higher education by examining three core dimensions: perceived organizational support, student leadership, and innovation capacities, which include intrapersonal resilience, social collaboration, and cognitive innovation. Through rigorous methodological procedures such as content validity assessment, exploratory factor analysis, and reliability and validity testing, this research identified a robust five-factor model accounting for over 72 percent of the variance, as shown in Figure 1. The internal consistency of the scale was excellent, with Cronbach's alpha ranging from 0.884 to 0.964. Factor loadings were strong and clean, with no significant cross-loadings, affirming the structural soundness of the instrument. Notably, the three dimensions of innovation capacity received full consensus from experts on item relevance, indicating strong conceptual clarity and cultural appropriateness within the context of Chinese higher education.

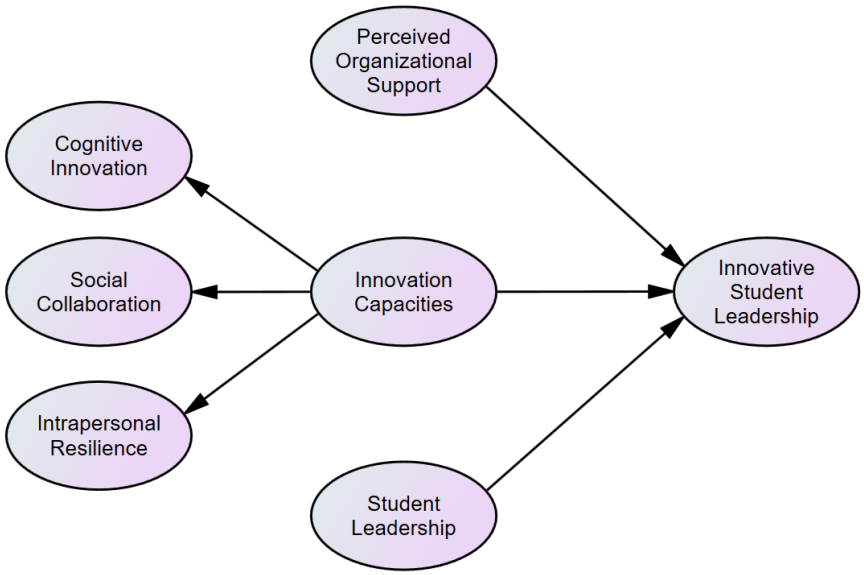

Figure 1. Conceptual Model of Innovative Student Leadership

As established in the Introduction, the cultivation of innovative leadership is critical in the contemporary global and technological context. This study provides empirical evidence supporting the notion that innovative leadership among university students is significantly influenced by perceived organizational support, aligning with arguments presented by (Li et al., 2023) and (Huang et al., 2025). However, the initial difficulty in achieving expert consensus on the Perceived Organizational Support items highlights the challenges of directly applying Western-based organizational theories to the Chinese university context. It underscores the necessity for culturally nuanced adaptations of organizational support theories and mechanisms. Given the distinctive dual-track management system characteristic of Chinese universities, where Communist Party-led student organizations play a central role, these findings offer crucial insights into how organizational structures can be tailored to enhance students' innovative leadership effectively.

[DOI: 10.61882/johepal.6.4.112]

The factor analysis further highlights the relative importance of perceived organizational support, accounting for the largest proportion of variance (24.532%), followed by cognitive innovation (13.786%) and social collaboration (12.995%). These results emphasize the practical need for universities to prioritize building robust systems that offer substantial emotional and instrumental support, fostering cognitive and collaborative innovation among students. Additionally, universities should aim to implement structured leadership training accessible to all students, moving beyond traditional student cadre groups, and promoting genuine student involvement in organizational decision-making processes, addressing critiques raised by Patrick (2025) and Welton et al. (2022).

This study provides critical validation of several theoretical perspectives from existing literature, notably confirming the relevance of perceived organizational support as a pivotal factor influencing student innovative leadership (Li et al., 2023; Yang & Zhou, 2022). This research substantiates previous findings by Uluturk (2024) and Huang et al. (2025), highlighting the importance of organizational climates in nurturing individual creativity through psychological empowerment and identification with organizational goals. At the same time, this study offers nuanced perspectives challenging some existing assumptions in literature. Contrary to earlier research that often implicitly assumes POS and student leadership initiatives uniformly promote innovative behaviors (Fan et al., 2022), this study's findings emphasize the importance of culturally adapted and context-sensitive organizational support frameworks. Specifically, the results underscore that innovation capacities among Chinese students not only rely heavily on external support mechanisms but also significantly interact with internal dimensions such as intrapersonal resilience and cognitive innovation strategies, suggesting a more complex interplay than previously conceptualized.

Furthermore, this research aligns with the sequential engagement theory proposed by Niu et al. (2025), reinforcing the idea that leadership experiences must be structured in phases and systematically integrated with academic responsibilities to effectively build innovation capacities among students. However, it also calls attention to the limitations of hierarchical administrative structures prevalent in Chinese universities, as described by Welton et al. (2022), advocating for meaningful student agency and structural integration.

By developing and validating a student innovative leadership model, this study enriches existing frameworks by explicitly articulating the complex interplay between internal and external factors shaping innovative leadership within the unique Chinese university context. It underscores the multidimensional and culturally contingent nature of perceived organizational support, highlighting the crucial need for emotional and instrumental dimensions within institutional practices. Furthermore, by validating a robust and culturally tailored measurement instrument, this research significantly advances methodological approaches for future studies examining innovative leadership in similar educational settings.

Conclusion

This study provides compelling evidence that innovative leadership among university students is shaped by a dynamic interplay between organizational support, leadership engagement, and multidimensional innovation capacities. By validating a context-sensitive

[DOI: 10.61882/johepal.6.4.112]

measurement model grounded in the realities of Chinese higher education, the findings emphasize the critical importance of both external structures, such as perceived emotional and instrumental support, and internal traits including resilience, collaboration, and creative thinking. The research not only reinforces established theories of leadership and organizational psychology but also challenges simplistic assumptions by highlighting the cultural and institutional nuances of Party-led university systems. These insights offer both theoretical enrichment and actionable recommendations for fostering inclusive, innovation-driven student development in higher education contexts worldwide.

Declaration of Conflicting Interests

The authors declare no conflicts of interest.

Funding

This research was supported by the 2025 Guangzhou Xinhua University Party Building Research Project (Grant number KT202523).

Human Participants

All procedures performed in studies involving human participants were in accordance with the ethical standards of Guangzhou Xinhua University research committee. Informed consent was obtained from all individual participants included in the study.

Originality Note

The authors confirm that this manuscript is original, has not been published previously, and is not under consideration for publication elsewhere.

Use of Generative AI/ AI-assisted Technologies Statement

The authors claimed that there is "No Use of Generative AI/ AI-assisted Technologies" in preparing this research.

[DOI: 10.61882/johepal.6.4.112]

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Ms. Weiling Wang - As the Party Branch Secretary and an English Lecturer at the School of Biomedical Engineering, Guangzhou Xinhua University, Wang Weiling leverages her dual expertise in party affairs management and language instruction to forge innovative pathways for applying scientific methods to the social sciences. The core of her research involves using empirical tools, such as quantitative analysis and survey research, to systematically examine the principles and practical effectiveness of Party building initiatives. Concurrently, she assesses the efficacy of English teaching strategies, aiming to provide a solid evidence-based foundation and theoretical insights for decision-making and practice in these respective fields.

Dr. Ziyun Song's work focuses on enhancing the cross-cultural technical communication competence of vocational students through a mixed-methods research approach. In his practice, he leads public English curriculum reform, develops domain-specific teaching materials, and integrates AI-powered assessments, all aimed at better preparing students for the global technical workplace.