

The influence of campus learning environment on academic burnout among Chinese college students in Sichuan

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Abstract: Background: The first year of college is a significant challenge for students. Prior research has focused on psychological distress and academic burnout among students in health-related disciplines. This study examined the relationship between first-year students' reported satisfaction with the campus learning environment and academic burnout, as well as differences across majors. Methods: A cross-sectional survey was conducted. Data on campus environment satisfaction and academic burnout were collected from 274 first-year students across majors at two universities in Sichuan Province, China. Results: Overall burnout levels were moderate, with nursing students scoring the lowest and students in economics and management scoring the highest. Male students scored significantly higher on cynicism and reduced academic efficacy. Satisfaction with the learning environment was a significant negative predictor of academic burnout. Significant differences were observed across disciplines in both academic burnout and satisfaction with the learning environment. Conclusion: The learning environment positively influences reductions in academic burnout, and intervention strategies should be tailored to specific majors. Future research should adopt a longitudinal design and include more institutions to improve causal inference and the generalizability of findings.

Keywords: academic burnout; learning environment; undergraduate freshmen; cross-sectional study

1. Introduction

Academic burnout has become a pressing issue in higher education, marked by emotional exhaustion, cynicism, and declining academic effectiveness. This phenomenon is widespread among freshmen in health-related majors, such as nursing and medicine, where heavy academic demands and transition challenges exacerbate psychological stress (Trigueros et al., 2020). Despite increased attention to academic burnout, existing research has primarily focused on individual students' psychological traits,

underestimating the role of contextual resources, such as the learning environment, in shaping burnout. Furthermore, previous studies often focus on a single discipline, limiting cross-disciplinary comparisons. In Chinese higher education, empirical evidence on the relationship between satisfaction with the learning environment and academic burnout among undergraduate students, particularly freshmen from different majors, remains limited. This gap hinders the development of targeted interventions that address both individual and environmental factors. This study aims to examine the influence of the campus learning environment on academic burnout among Chinese college students in Sichuan.

2. Background

Since Freudenberger (1974) first introduced the term “burnout” in a survey of service workers, research on burnout has been a prominent focus in professional settings. Although Maslach and Jackson (1981) later systematized it to include symptoms such as emotional exhaustion, dehumanization, and low achievement, academic burnout has only recently been recognized as a distinct and complex concept among student populations. Meier and Schmeck (1985) and Pines (1980) defined academic burnout as a state in which students become exhausted due to prolonged academic pressure and burden, gradually lose enthusiasm for their studies and activities, become indifferent and alienated from their classmates, and lose motivation for their studies. Schaufeli (2002) suggests that academic burnout encompasses emotional exhaustion, cynicism, and academic inefficiency, stemming from a persistent inability to manage academic stress effectively. Taiwan scholar Yang Huizhen defines academic burnout as emotional exhaustion, dehumanization, and a low sense of personal accomplishment caused by students' academic pressure, workload, or other psychological factors during the learning process (Yang Huizhen, 1998). Some scholars have summarized previous research and described academic burnout as the emotional exhaustion, cynicism, and low sense of personal achievement that students experience during learning due to academic pressure, workload, or other psychological factors (Liu et al., 2023). The reliability and validity of the MBI-SS scale have been confirmed in Chinese student samples; however, evidence remains limited, especially among cross-disciplinary first-year students. International research indicates that the first year of university can be particularly challenging for students (Auerbach et al., 2018; March-Amengual et al., 2022). The transition from high school to college, academic pressure, lack of family support, and financial issues can trigger high stress levels, leading to emotional exhaustion. Burnout is linked to academic performance, and its overall prevalence among college students is considerable (Bai, 2019; Fengmei Zhang, Cuili Ma, 2020). Therefore, research on the learning environment and academic burnout among first-year college students across different majors in China is necessary to improve the applicability of local findings and intervention strategies.

The campus environment fosters holistic growth for students. Students feel secure and comfortable while learning and enjoying college life, which encourages a positive learning mood (J. Krishnaiah, 2024). Some scholars argue that the campus environment and facilities significantly influence the happiness of college students with average academic performance (Zou et al., 2024). Numerous studies indicate that university campus landscapes can enhance student happiness and reduce stress (Gulwadi et al., 2019; Malekinezhad et al., 2020; Nie et al., 2024). In a campus setting, dormitories serve as both living and learning spaces, and thus the dormitory environment can significantly impact students' overall well-being and academic achievement (Phan et al., 2024). As vital parts of students' daily lives and studies, the dormitory atmosphere, management style, and roommate relationships directly influence students' engagement in learning. Research shows that a competitive classroom climate harms inclusiveness and safety, as students who perceive high competitiveness are more prone to anxiety and depression (Posselt, 2021). An environment of equal participation and valued student input fosters student well-being. Providing students with opportunities to share their perspectives and ideas about the course fosters a sense of belonging and contentment within the learning environment (Konstantinidis, 2024). Evidence suggests that instructors' supportive attitudes,

compassion, professional skills, accessibility, responsiveness, positive classroom interactions, enthusiasm, and dedication significantly enhance student achievement (Eloff, 2023). School atmosphere directly influences academic burnout and indirectly affects it through psychological capital, which partially mediates the relationship (Tang, 2024). This study views the learning environment as a comprehensive resource, including school infrastructure, campus landscape, classroom climate, dormitories, teacher-student interactions, and overall school atmosphere. Based on this, the study examines "satisfaction with the learning environment" as a variable, aiming to buffer student burnout by exploring the "support-control-recovery" mechanism.

Studies have shown significant differences in academic burnout among students across majors. Compared with other medical and teacher-training students, nursing students experience more severe academic burnout, particularly a low sense of achievement (Yang Li et al., 2024). Olson et al. (2025) believed that students majoring in information science and engineering were more likely to experience stress and burnout, while students majoring in medicine and sports and health science fared comparatively better. Research by Rosales-Ricardo et al. (2021) indicates that academic burnout is common among college students of various majors and is generally at a moderate level. The overall prevalence of academic burnout among college students across different majors worldwide is close to 40%. The findings of Rosales-Ricardo et al. (2021) show that medical, nursing, engineering, and information technology students have a high prevalence of academic burnout, whereas students in the arts, social sciences, business, and dentistry tend to have lower levels. Other studies suggest no significant difference in academic burnout between students majoring in health sciences and those in non-health sciences (March-Amengual et al., 2022). This study proposes that these disciplinary differences may be attributed to factors such as course difficulty, competitive assessments, reliance on labs, and practical workload, as well as uneven allocation of resources and learning support. Therefore, conducting cross-disciplinary comparisons within the same institutional and regional contexts can more clearly distinguish the effects of "disciplinary characteristics" versus "environmental factors" on academic burnout.

Existing research in China has mainly focused on the structure of burnout scales and samples from single disciplines. There is a lack of cross-disciplinary studies that incorporate comprehensive models of learning environment satisfaction. Although some research has examined campus landscapes, school atmospheres, dormitories, and faculty support at Chinese university campuses, a comprehensive framework for examining and comparing these factors within the "environmental satisfaction-academic burnout" relationship is lacking. Based on the expectation that the campus learning environment can reduce academic burnout, this study systematically compares academic burnout and satisfaction with the learning environment across different majors among first-year undergraduates at two universities in Sichuan. Additionally, the study explores the predictive role of learning environment satisfaction on academic burnout, providing evidence for localized, actionable student support strategies.

3. Methodology

Research Design and Participants

This study used a cross-sectional survey design. Data were gathered from two universities in Sichuan Province, China, between June and July 2025. A total of 312 questionnaires were distributed, with 274 valid responses obtained after data cleaning. Participants were first-year undergraduate students from eight major fields: clinical medicine, nursing, pharmacy, medical technology, public health, science and engineering, humanities and social sciences, and economics and management. Demographic information such as gender, age, and home address was also collected.

Instruments

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Academic burnout was assessed with the Chinese version of the Maslach Burnout Inventory-Student Survey (MBI-SS), which includes three dimensions: emotional exhaustion (EE), cynicism (CY), and reduced efficacy (RED). Cronbach's alpha coefficients indicated good reliability for both the overall scale and the subscales ($\alpha > 0.80$). Satisfaction with the learning environment was assessed using a self-report questionnaire that covered campus infrastructure, academic resources, classroom atmosphere, and overall campus climate. This scale also showed good internal consistency ($\alpha > 0.75$). The burnout scale contains reverse-coded items.

Data Analysis

Data were analyzed using SPSS 25. Descriptive statistics summarized demographic characteristics and key study variables. Reliability tests (Cronbach's alpha) and normality tests (Kolmogorov-Smirnov, Shapiro-Wilk, histograms, and Q-Q plots) were conducted. Independent sample t-tests examined gender differences in burnout and satisfaction with the learning environment. After controlling for demographic variables, hierarchical regression analysis tested whether satisfaction with the learning environment predicted burnout. Furthermore, multivariate analysis of variance (MANOVA) explored differences in burnout dimensions and satisfaction with the learning environment across different majors.

Conceptual Framework

A social ecological perspective and burnout theory guide the conceptual framework of this study (Figure 1). This framework hypothesizes that: the learning environment is negatively correlated with academic burnout (H1); that academic burnout and learning environment differ significantly across majors (H2); and that satisfaction with the learning environment remains a significant predictor of burnout, even after controlling for demographic factors (H3).

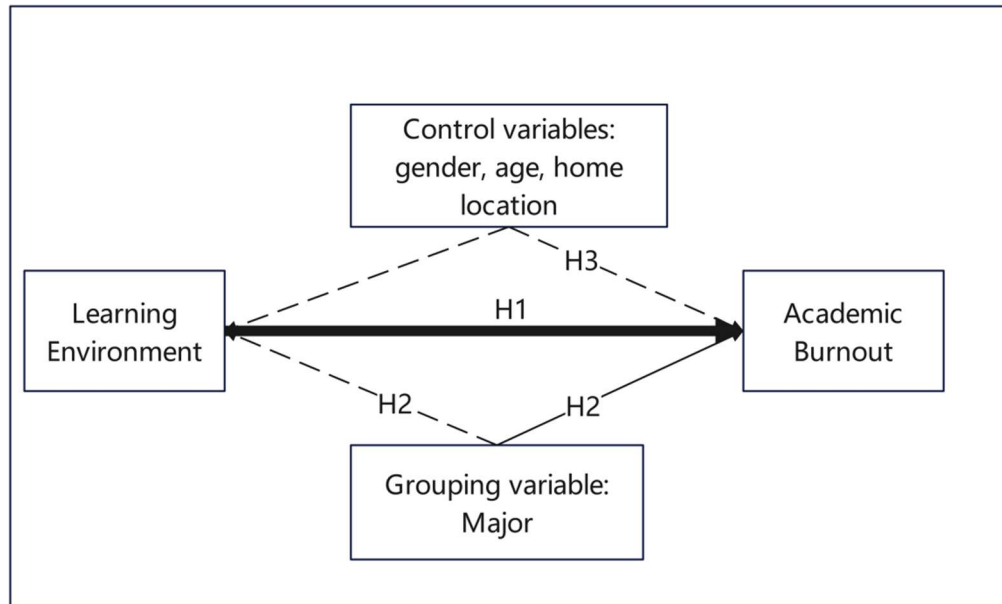


Figure 1: Conceptual Framework

4. Results

Table 1 Demographic characteristics of participants (N = 274)

Variable	Category	n	%
Gender	Male	108	39.4
	Female	166	60.6

Age (years)	Mean (SD)	19 (0.852)	-
Major	Clinical Medicine	32	11.7
	Nursing	55	20.1
	Pharmacy	33	12
	Medical Technology	25	9.1
	Public Health	35	12.8
	Science & Engineering	45	16.4
	Humanities & Social Sciences	25	9.1
	Economics & Management	24	8.8
	Towns	111	40.5
	rural areas	163	59.5

Participant characteristics

A total of 274 undergraduate students participated in this study. The demographic characteristics of the participants are presented in Table 1. The sample consisted of 60.6% females and 39.4% males, with a mean age of 19 years (SD = 0.852). Regarding their majors, nursing was the most common (20.1%), followed by science and engineering (16.4%) and public health (12.8%). Other majors included pharmacy (12.0%), clinical medicine (11.7%), humanities and social sciences (9.1%), medical technology (9.1%), and economics and management (8.8%). Among the students, 59.5% came from rural families, while 40.5% were from urban families. The comparison of undergraduates across different majors was based on the understanding that these fields differ significantly in course structures, academic workloads, learning styles, and future career expectations, which often influence academic burnout and satisfaction with the learning environment. Including the major variable provides a more comprehensive understanding of the mechanisms underlying academic burnout and offers more targeted insights for educational administrators. From my perspective, comparing different majors is both theoretically important and practically valuable. It highlights that educational interventions should not adopt a one-size-fits-all approach but should be tailored to the specific characteristics of each discipline. It also reveals imbalances in educational resource allocation and the development of a healthy university environment, which necessitate greater attention and adaptation at policy and practical levels. In essence, examining differences among majors can facilitate more equitable and effective educational improvements.

Table 2: Independent samples t-test results for gender differences in burnout dimensions and environment satisfaction

Variable	Gender	N	M	SD	t	df	p	Mean Diff.	95% CI LL	95% CI UL	Cohen's d
Cynicism (CY)	Male	108	12.47	3.85	2.73	272	.007**	1.24	0.35	2.14	0.336
	Female	166	11.23	3.58							
Reduced Academic Efficacy (RED)	Male	108	14.05	3.73	2.87	272	.005**	1.23	0.38	2.07	0.355
	Female	166	12.82	3.28							

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Note. CI = confidence interval; LL = lower limit; UL = upper limit. $p < .01$.

An independent sample t-test was conducted to examine gender differences in burnout and environmental satisfaction. The results (Table 2) indicated that boys scored significantly higher than girls in cynicism (CY: $t(272) = 2.73$, $p = .007$, $d = 0.34$) and academic efficacy (RED: $t(272) = 2.87$, $p = .005$, $d = 0.36$). No significant gender differences were observed in overall burnout, emotional exhaustion (EE), or environmental satisfaction (all p -values > 0.05). The study found that male students scored higher on cynicism and lower on academic efficacy than female students, suggesting that gender differences may influence specific burnout dimensions. Possible explanations include: males are more likely to cope with academic pressure through avoidance and negative attitudes, which increase cynicism; simultaneously, they face dual pressures of social expectations and academic competition affecting self-efficacy, leading to a perception of "lack of ability." Conversely, female students generally show greater academic engagement and stronger social support networks, resulting in lower scores on the CY and RED dimensions. However, no gender differences emerged in overall burnout and emotional exhaustion, indicating that overall academic burnout is more influenced by the learning environment and academic demands than by gender.

Table 3 Descriptive Statistics of Academic Burnout Total and Learning Environment Satisfaction (N = 274)

Variable	N	Min	Max	Mean	SD
Burnout_Total	274	15.00	74.00	39.0949	8.82087
EE_Sum	274	5.00	25.00	14.0730	4.21342
CY_Sum	274	5.00	25.00	11.7190	3.73252
RED_Sum	274	5.00	24.00	13.3029	3.51025
Env_tatal	274	5.00	23.00	11.4964	3.12176

As shown in Table 3, total scores for academic burnout ranged from 15 to 74 ($M = 39.09$, $SD = 8.82$), indicating a moderate level of overall burnout among first-year undergraduates. Among the three subscales, emotional exhaustion (EE) had the highest mean score ($M = 14.07$, $SD = 4.21$), followed by decreased academic efficacy (RED; $M = 13.30$, $SD = 3.51$) and cynicism (CY; $M = 11.72$, $SD = 3.73$). Total scores for campus environment satisfaction ranged from 15 to 23 ($M = 11.50$, $SD = 3.12$), indicating a moderate level of overall satisfaction with the environment. This result suggests that first-year undergraduates generally experience moderate levels of academic burnout, indicating that students face considerable academic and adaptation pressures during their initial university years. Furthermore, satisfaction with the learning environment was below average, possibly due to limited university resources, insufficient adaptation to the campus environment, or a gap between students' expectations and the reality of university learning.

Table 4 Hierarchical regression analysis of learning environment satisfaction predicting academic burnout (N = 274)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R ²	Δ R ²	F	p (model)
		B	Std. Error	Beta						
1	constant	23.633	1.795	-	13.168	.000	.227	-	79.669	<.001
	Env	1.345	.151	.476	8.926	.000				
2	constant	18.215	10.893		1.672	.096	.234	0.007	20.575	<.001
	Env	1.336	.152	.473	8.793	.000				

Model 1 included learning environment satisfaction; Model 2 additionally controlled for gender, age, and

home	Gender	-1.058	.982	-.059	-1.076	.283
	Age	.280	.558	.027	.502	.616
	Home location	1.188	.980	.066	1.212	.226

location.

Hierarchical regression analysis was used to examine the predictive effect of learning environment satisfaction on academic burnout. As shown in Table 4, Model 1 indicates that learning environment satisfaction significantly predicted academic burnout ($\beta=0.476$, $p<0.001$), explaining 22.7% of the variance ($R^2=0.227$). In Model 2, after controlling for gender, age, and home address, learning environment satisfaction remained a significant predictor ($\beta=0.473$, $p<0.001$), while demographic variables were not significant ($p>0.05$). The change in explained variance ($\Delta R^2 = 0.007$) was negligible. This suggests that the learning environment is a more important factor in influencing students' academic burnout than individual differences such as gender, age, and home address. This may be because undergraduate freshmen generally face common adaptation challenges during their initial university years. Therefore, environmental support (such as academic resources, campus atmosphere, and student-faculty interaction) has a more direct impact on their level of academic burnout than demographic background.

Table 5: Descriptive Statistics of Burnout Dimensions and Learning Environment by Major

Major	N	EE (M $\pm$ SD)	CY (M $\pm$ SD)	RED (M $\pm$ SD)	Burnout (M $\pm$ SD)	Env (M $\pm$ SD)
Clinical Medicine	32	13.91 $\pm$ 3.91	10.78 $\pm$ 3.09	12.88 $\pm$ 3.01	37.56 $\pm$ 7.46	11.69 $\pm$ 2.47
Nursing	55	12.71 $\pm$ 3.62	10.35 $\pm$ 2.95	12.56 $\pm$ 3.33	35.62 $\pm$ 7.23	11.38 $\pm$ 2.61
Pharmacy	33	13.97 $\pm$ 3.22	10.70 $\pm$ 3.78	13.06 $\pm$ 3.11	37.73 $\pm$ 7.19	10.24 $\pm$ 2.96
Medical Technology	25	15.08 $\pm$ 5.18	13.12 $\pm$ 4.02	13.68 $\pm$ 3.73	41.88 $\pm$ 10.93	12.08 $\pm$ 3.75
Public Health	35	13.49 $\pm$ 4.34	11.69 $\pm$ 3.88	12.91 $\pm$ 3.88	38.09 $\pm$ 9.40	10.54 $\pm$ 19
Science/Engineering	45	14.47 $\pm$ 4.00	13.18 $\pm$ 3.93	14.22 $\pm$ 3.55	41.87 $\pm$ 9.10	12.53 $\pm$ 3.77
Humanities/Social Sc.	25	14.40 $\pm$ 4.43	12.52 $\pm$ 3.75	13.24 $\pm$ 3.54	40.16 $\pm$ 8.33	11.40 $\pm$ 2.65
Economics/Management	24	16.29 $\pm$ 5.13	12.54 $\pm$ 3.74	14.42 $\pm$ 3.96	43.25 $\pm$ 9.43	12.17 $\pm$ 2.90
Total	74	14.07 $\pm$ 4.21	11.72 $\pm$ 3.73	13.30 $\pm$ 3.51	39.09 $\pm$ 8.82	11.50 $\pm$ 3.12

The overall multivariate test was significant (Wilks' Lambda = 0.810, $F(28,949.68) = 2.041$, $p = 0.001$, partial $\eta^2 = 0.051$), indicating differences between majors. A multivariate analysis of variance (MANOVA) was used to examine the impact of major on academic burnout dimensions and satisfaction with the learning environment (see Table 5). Students from different majors showed varying levels of academic burnout and satisfaction with the learning environment. Overall, students majoring in economics and management had

the highest total academic burnout scores ($M = 43.25$, $SD = 9.43$), while students in nursing had the lowest scores ($M = 35.62$, $SD = 7.23$). At the dimensional level, students in economics and management exhibited higher mean scores for emotional exhaustion (EE) and decreased academic efficacy (RED), while nursing students scored the lowest on both dimensions. Students in science, engineering, and medical technology scored higher on cynicism (CY), suggesting they may be more prone to negative academic attitudes. Regarding satisfaction with the learning environment, pharmacy students scored the lowest ($M = 10.24$, $SD = 2.96$), whereas science and engineering students scored the highest ($M = 12.53$, $SD = 3.77$). This difference may relate to the curriculum structure and learning requirements of different majors. For example, first-year nursing courses focus on foundational knowledge and humanities content, thereby reducing academic pressure. In contrast, students in economics and management, as well as science and engineering majors, face a more demanding curriculum and greater academic burdens in their first year, which may lead to burnout. Additionally, pharmacy courses depend heavily on laboratory conditions and resources; insufficient support can reduce student satisfaction with the environment.

Table 6: Tests of Between-Subjects Effects

Dependent Variable	F	p	Partial η^2
EE (Emotional Exhaustion)	2.23	0.032	0.055
CY (Cynicism)	3.77	0.001	0.09
Burnout (Total)	3.56	0.001	0.086
Env (Environment)	2.33	0.026	0.058

Analysis of between-subjects effects showed significant differences among majors in emotional exhaustion ($F(7,266)=2.23$, $p=0.032$, partial $\eta^2=0.055$) and cynicism ($F(7,266)=3.77$, $p=0.001$, partial $\eta^2=0.090$), but no significant differences in decreased academic efficacy ($F(7,266)=1.34$, $p=0.231$). Significant differences were also found in total burnout ($F(7,266)=3.56$, $p=0.001$, partial $\eta^2=0.086$) and satisfaction with the learning environment ($F(7,266)=2.33$, $p=0.026$, partial $\eta^2=0.058$). These differences may result from the varying academic workloads and learning environments experienced by students in different majors. For instance, science, engineering, and medical technology majors have demanding courses and many experimental tasks, which can easily increase cynicism. Nursing majors, however, have a relatively lighter course load during their first year, resulting in generally lower academic burnout. Additionally, differences in satisfaction with the learning environment might relate to uneven resource distribution across disciplines, such as laboratory equipment, academic support, and opportunities for student-faculty interaction. These factors can influence students' learning experiences and psychological well-being to different extents.

To further examine the relationship between major and academic burnout, we included satisfaction with the learning environment as a potential moderator variable (PROCESS model 1). The results showed that the interaction term was not significant ($p>0.05$), indicating that satisfaction with the learning environment did not significantly influence the relationship between major and academic burnout.

4. Discussion

This study tested three hypotheses about the relationship between satisfaction with the campus learning environment and academic burnout among Chinese university students. Overall, the findings supported these hypotheses. First, satisfaction with the environment was negatively linked to burnout, highlighting the protective role of a supportive learning environment in reducing academic burnout. Second, there were significant differences across majors in emotional exhaustion, cynicism, and overall burnout, but no

significant differences in diminished efficacy, thus partially supporting Hypothesis 2. Third, even after controlling for demographic variables, satisfaction with the environment remained a significant predictor of burnout, emphasizing the importance of environmental factors over individual traits.

Gender analysis showed that boys exhibited higher cynicism and a lower sense of efficacy than girls, which aligns with some previous research results (Liu et al., 2023). However, there were no differences between the two groups in emotional exhaustion or overall burnout, suggesting that disciplinary factors may be more significant than gender. Discipline-specific patterns further enriched the findings: nursing students reported relatively lower levels of burnout compared to students in science, engineering, and business, contrary to earlier studies that identified nursing as a high-risk group (Hasson et al., 2021; March-Amengual et al., 2022; Rosales-Ricardo et al., 2021). This may reflect differences in curriculum design, with first-year nursing programs emphasizing foundational and humanities courses, while other majors face greater competition and resource demands. Pharmacy students were less satisfied with their environment than students in science and engineering, suggesting an inequitable distribution of educational resources.

These findings reinforce burnout theory, suggesting that academic burnout is not just an individual student's psychological state but rather a consequence of the learning environment. They also expand the social ecological model by highlighting the role of external resources in reducing student stress.

5. Conclusion

This study emphasizes the importance of a supportive learning environment in reducing student burnout. Its significance is in shifting the focus from individual students to systemic factors. For universities, the findings suggest the need for targeted investment in campus resources, the equitable distribution of facilities across disciplines, and the promotion of a supportive classroom atmosphere. Educators can also work to lessen students' competitive tendencies and strengthen their sense of belonging.

Although limited by its cross-sectional design and the use of samples from two universities in Sichuan, this study provides a foundation for longitudinal and cross-cultural comparisons across the Asia-Pacific region. Future research should explore causal pathways and investigate how environmental interventions can mitigate burnout across disciplines.

In summary, by creating supportive and resourceful learning environments, universities can reduce student academic burnout, strengthen student resilience, and encourage sustainable academic success.

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Compliance with ethical standards

This study was conducted in accordance with ethical guidelines for research involving human participants. Ethical approval was obtained from the Ethics Committee of North Sichuan Medical College, China. Participation was voluntary, and informed consent was obtained from all respondents before completing the survey. The study received no funding, and the author declares no conflict of interest.

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