International Journal for Housing Science and Its Applications
Publish August 10, 2025. Volume 46, Issue 4 Pages 6722-6727

https://doi.org/10.70517/ijhsa464574

Research on the influence mechanism of college students' dormitory living environment on academic stress relief and mental health promotion

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Abstract This paper takes the living environment transformation of college students' dormitories as an entry point to explore its influence mechanism on college students' academic stress relief and mental health promotion. The five dimensions of functional partitioning, color and lighting, storage and greenery, socialization and privacy, and intelligent design are used to realize the transformation of college students' dormitory living environment. Taking a university as the research object, 84 students were randomly assigned into experimental and control groups for comparison. The results showed that in terms of academic stress, the stress score decreased from (7.23±1.35) to (6.28±1.31), and the cortisol level decreased from (13.47±2.27) μg/dL to (11.95±1.94) μg/dL. In terms of mental health, the depressive symptom, anxiety level, and the quality of sleep were significantly improved. It can be seen that college students' dormitory living environment remodeling can effectively alleviate students' academic pressure and promote the development of mental health, indicating that it has an important application value in the construction of college health promotion type.

Index Terms college students' dormitory, living environment renovation, academic stress, mental health, anxiety level

I. Introduction

College students' dormitory is not only a study, living and rest area, but also an important space to strengthen communication between students, establish friendship and improve the comprehensive quality of college students. With the development of the times, the learning pressure of college students is increasing, and this pressure is not only reflected in the classroom learning, but also in the confusion and bewilderment of college students facing the future direction of employment [1], [2]. A good living environment in the university dormitory can help freshmen quickly adapt to university life, making the dormitory become a warm “big family”. Living in the dormitory is as convenient and comfortable as living at home, which can relieve the multiple pressures of study and employment, and help students to face the problems of study with optimism and cheerfulness, and set up goals for future employment with a healthy mental state [3], [4].

In order to alleviate the academic pressure of college students and promote their psychological health development. In the living environment of college students' dormitory, the functionality of the area can optimize the study area, rest area and leisure area of the dormitory, and improve the comfort of students. The color scheme and lighting of the dormitory can create a soft environment and natural light for the dormitory, helping students relax. Storage and greenery design helps to keep the dormitory area clean and tidy, and comprehensively organizes students' personal belongings to ease their academic anxieties. The social privacy design not only improves students' communication, but also maintains students' private space, realizing a balance between openness and privacy in students' dormitory life. Intelligent design can strengthen the intelligent function of the dormitory, strengthen the scientific detection of students' daily life, and protect students' health. After the above optimization of college students' dormitory living environment, creating a scientific, healthy and clean dormitory environment will play a positive role in alleviating college students' academic pressure and promoting the development of mental health.

II. Upgrading the living environment of university student dormitories

II. A.Functional zoning design

In the living environment of college students' dormitory, it involves multiple aspects of students' study, rest and entertainment, so these aspects of needs should also be fully considered in the design of the functionalized

partition of the dormitory [5]. Independent desks should be set up to minimize interference from other students, and the width of the desk should be greater than 75cm, so that it is easy to place books and lamps on the desk. A post-it wall can also be set up on the front directly opposite the student's seat, which can be used to stick key knowledge in learning, family photos, etc. on the top, which not only serves as a reminder, but also gives students encouragement and boosts their self-confidence through the photos of their family members. Seats should be comfortable and ergonomic to increase students' comfort in learning. The bed should be designed for privacy by setting the bed above the desk with a window curtain to block out light and ensure privacy. Configure bedside lamps and shelves at the head of the bed for lighting and placing items. The walls of the dormitory should be equipped with soundproof panels to minimize the disturbance of external noise to students' sleep or study. Dumbbells, full-body mirrors, TVs, etc. can be placed in common areas to facilitate students' leisure activities such as working out and watching TV, so as to alleviate the pressure brought about by their studies and to promote healthy physical and mental development.

II. B.Color and Lighting Design

In the dormitory of college students, color matching is very important, such as walls, shed roof, desks, beds, seats and floors, and other items of the color should be beige, light blue, light green, logs and other light colors, light colors will give a person a warm, comfortable, refreshing feeling. Students in a light-colored environment can maintain a smooth mood and reduce the sense of inner depression and irritability. Meanwhile, the colors of curtains, pillows and bedding can be set to light orange, soft green, etc. These colors help stimulate students' creativity and help them get out of inertia and solve problems in learning. Intelligent lighting, on the other hand, is designed to compensate for the natural light when the natural light is insufficient in the evening or rainy weather, so as to improve the visual comfort of students [6], [7]. In addition, anti-glare light strips are designed around the roof of the dormitory to enhance the uniformity of light in the dormitory, and the light of the light strips should be selected in light yellow color to avoid strong incandescent light to stimulate the eyes. The desk lamp on the desk, bedside lamp on the bed, and emergency sensor light should be set to 4500k white light, 2500k warm light, and ≤25Lux, respectively, and the emergency light should be set to avoid strong light interference with roommates' sleep.

II. C.Storage and Greenery Design

In the living environment of student dormitory, storage design is indispensable. Before the beginning of the school year, students bring many daily necessities such as bedding, pillows, and seasonal change of clothes into the campus, so it is necessary to comprehensively store these daily necessities through a reasonable storage design. First, a storage layer is placed 75cm from the desktop to collect books, stationery and other school supplies. Then, a storage cabinet with a height of 1.6m is set up on the side of the desk, with hanging and stacking areas inside the cabinet, and the height of the shoe rack is set at 0.3m, so that clothing, shoes, hats, sheets, pillowcases, etc. can be placed in the cabinet according to the needs. Finally, two storage cabinets can be set up under the desk, one for storing students' suitcases or bags, and the other can be designed as an upper and lower layer, the upper layer for placing toiletries, and the lower layer for placing a variety of pots. Through comprehensive and neat storage, it can improve the neatness of the dormitory living environment, reduce students' anxiety, relieve stress, and improve the comfort of students' living [8]. The setting of green plants can not only purify the air, its full of vitality green can bring students the feeling of greenery and tenacious vitality, and more green plants can help relieve eye fatigue. By watering the greenery every day, it improves students' sense of responsibility and love, and also helps them relieve academic pressure. However, it is important to note that appropriate greenery needs to be chosen by determining if the roommate is allergic to pollen.

II. D.Social and Privacy Design

As an independent individual in the social group, college students not only need to strengthen communication with other individuals, but also need to have their own privacy in order to realize the balanced interaction of individuals [9]. Privacy design, usually two beds in the dormitory are next to each other, in order to enhance privacy can be added between the beds and beds partition, but also in the desk to desk partition, in order to reduce the interference from the neighboring desk during the study period. In the dormitory above the door set up an area of 0.03m² LED screen, and set the time to remind it, when the time for the night 22:00, the LED screen will automatically emit a sound prompting students to go to sleep, and the LED screen will display the words “sleep do not disturb” to remind the students to sleep, to avoid disturbing others, thus promoting student self-discipline, optimizing the dormitory, and optimizing the dormitory, to avoid disturbing others. This promotes self-discipline, optimizes dormitory roommate relationships, and paves the way for students to relieve stress. In terms of social design, a cultural wall can be set up on the blank wall, which can be posted on the cultural wall with pictures of

roommates, roommates' birthdays, roommates' hobbies, countdown to exams, vacation travel plans, etc., which will not only increase roommates' feelings, but also create a harmonious atmosphere of mutual respect and mutual love in the dormitory, which will help alleviate the pressure of students' academics and promote their mental health.

II. E. Intelligent Design

With the progress of science and technology, schools are called to change from the traditional teaching mode to the multimedia teaching mode, so many schools, in order to improve the quality of teaching, introduce a variety of multimedia devices in the school classroom in order to strengthen the students' learning interest and classroom atmosphere. In the living environment of college students' dormitories, a variety of intelligent devices can also be installed, such as intelligent temperature monitors to monitor the temperature in the dormitory in real time [10], [11]. When the indoor temperature is found to be lower than the most comfortable temperature set, the air conditioner will be automatically started to adjust the temperature until it is adjusted to the most comfortable temperature set, so as to ensure the comfort of the living environment of college students' dormitory as well as not to fall ill because of the temperature. Intelligent air monitor can also be installed in the dormitory, when it is found that the air temperature and humidity do not reach the set standard, it will automatically turn on the air purifier to purify the air until the temperature and humidity in the air reaches the standard value.

III. Analysis of student stressor mental health outcomes

III. A. Study Population and Data Collection

This paper takes the students in male and female dormitories of a university as the research object, and adopts the questionnaire survey method to randomly issue 270 research questionnaires, which is about the impact of dormitory living environment modification on college students' academic stress alleviation and healthy psychological promotion. Finally, 263 questionnaires were retrieved, of which 241 were valid questionnaires, with an effective recovery rate of 89.26%. And take SPSS 20.0 software to process the data, normal distribution measurement data described as ($\overline{x} \pm s$).

III. B. Statistics on the results of the questionnaire

The results of the 241 questionnaires are shown in Figure 1. 90% of the students think that the renovation of the living environment in the dormitory will make the dormitory life more comfortable, 79% think that the renovated dormitory environment has more privacy, 92% think that the dormitory environment renovation will help to improve the relationship between the dormitory roommates, 76% think that the renovated dormitory environment will make students feel happy, and 84% think that the renovated dormitory environment will help to relieve the pressure of academic work, and 82% think that the renovated dormitory environment will help to promote students' mental health. 76% of the students believe that the remodeled dormitory environment will make students feel happy, while 84% of the students believe that the remodeled dormitory environment will help to alleviate academic stress, and 82% of the students believe that the remodeled dormitory environment will help to promote the mental health of the students. The results of the questionnaire fully confirm the positive effects of optimizing the dormitory environment of students and support the well-being of the overall impact of the residential environment renovation strategy proposed in this paper on students.

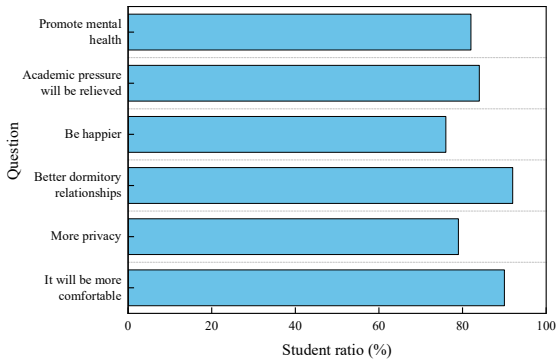

Figure 1: Survey Questionnaire Results

III. C. Intergroup outcome statistics

A university in October 2024 began to college students dormitory living environment renovation until the completion of December 2024, to the university dormitory of 84 students as the object of study, 42 of them were randomly

selected as the experimental group, the remaining 42 people as the control group. Both groups of students previously lived in the traditional dormitory living environment, after the university dormitory living environment, the experimental group of students and moved into the transformed dormitory living environment to live in 5 months, while the control group of students YiYan live in the traditional dormitory living environment in 5 months, the two groups of students in the normal class, after class back to the dormitory to study, rest, etc. After 5 months, the two groups of college students stress relief situation and mental health After 5 months, the stress relief and mental health of the two groups of college students were compared, and the data were processed by SPSS 11.0 software, and all the data were expressed as (x±s), and the t-test was used, and P<0.05 was taken as the difference was statistically significant.

III. C. 1) Pre-retrofit analysis

In order to ensure the accuracy of the comparison results, it is necessary to compare the academic stress as well as mental health of the two groups of college students before the dormitory living environment is remodeled. College students' academic stress scores were completed through the stress self-assessment scale, and college students' mental health scores were completed through the depression scale and anxiety scale, and descriptive statistics of the results of the pre-test are shown in Table 1. The results show that the comparison of college students' academic night and mental health before the remodeling of college dormitory environment is not statistically significant, P>0.05.

Table 1: Descriptive statistics of pre-test results (x ± s)

Group	Gender ratio (male/female)	Academic stress score (1-10 points)	Mental health score (1-10 points)	
			Depression score	Anxiety score
Experimental group (n=42)	20/22	6.41±1.19	5.94±1.69	5.65±1.62
Control group (n=42)	21/21	7.23±1.35	5.89±1.49	5.73±1.58
t value		2.79	1.57	1.25
P value		>0.05	>0.05	>0.05

III. C. 2) Analysis of lateral academic pressure after modification

After a five-month dormitory living environment intervention for college students in the experimental and control groups, the analysis of academic stress between the groups is shown in Table 2. The results showed that none of the data between the groups were statistically significant before the remodeling, P>0.05. After the remodeling, the experimental group showed significant improvements in stress scores, cortisol levels, and average daily hours of focused study. The stress score of the experimental group decreased from (6.41±1.19) to (3.94±1.27), the cortisol level decreased from (13.61±2.42) μg/dL to (8.69±1.67) μg/dL, and the average daily length of focused study increased from (3.64±1.22) to (5.35±1.22) after the remodeling of the college students' dormitory living environment, and the change was significant. The magnitude of change was significant. The experimental group of students living in the remodeled dormitory living environment can significantly alleviate academic stress. In contrast, in the traditional dormitory living environment of the control group college students, the stress score decreased from (7.23±1.35) to (6.28±1.3)1, the cortisol level decreased from (13.47±2.27) μg/dL to (11.95±1.94) μg/dL, and the average daily hours of focused study increased from (3.57±1.13) hours to (3.96±1.09) hours, and the magnitude of change was not significant. Therefore, the living environment of college students' dormitory can effectively alleviate college students' academic stress, verifying the important role of dormitory environment optimization in promoting students' mental health and academic stress management.

Table 2: Analysis of academic stress between groups (x ± s)

Indicator	Stress score (1-10 points)		Cortisol level (μg/dL)		Average daily focused study time (hours)	
	Before	After	Before	After	Before	After
Experimental group (n=42)	6.41±1.19	3.94±1.27	13.61±2.42	8.69±1.67	3.64±1.22	5.35±1.22
Control group (n=42)	7.23±1.35	6.28±1.31	13.47±2.27	11.95±1.94	3.57±1.13	3.96±1.09
t value	3.79	3.25	1.52	1.78	2.33	2.09
P value	0.26	0.036	0.49	0.041	0.13	0.032

III. C. 3) Analysis of mental health on the post-retrofit side

The experimental group and the control group were analyzed for post-reform side mental health between the groups, and the depressive symptoms, anxiety level, social support perception and sleep quality were selected as

the important analysis indexes of college students' mental health, and Table 3 shows the analysis of post-reform side mental health. After the dormitory living environment remodeling, the college students in the experimental group showed significant improvement in depressive symptoms, anxiety level decreased to (11.31±3.45), (44.79±5.46), and social support perception and sleep quality increased to (45.73±5.68), (11.31±2.43). Therefore, it is further confirmed that the optimization of dormitory living environment can alleviate the stressful emotions of college students and promote mental health.

Table 3: Analysis of psychological health after transformation (x ± s)

Indicator	Depression symptoms		Anxiety Level		Perceived social support		Sleep quality	
	Before	After	Before	After	Before	After	Before	After
Experimental group (n=42)	18.49±3.96	11.31±3.45	44.79±5.46	33.13±5.14	30.09±5.38	45.73±5.68	6.36±1.79	11.31±2.43
Control group (n=42)	18.37±3.79	16.74±4.02	44.63±5.64	42.11±5.73	30.27±4.96	32.47±5.03	6.34±2.43	9.04±2.22
t value	2.11	1.79	3.86	4.44	2.19	2.35	2.97	2.86
P value	0.47	0.041	0.09	0.016	0.08	0.025	0.25	0.018

IV. Conclusion

In this paper, 84 college students from a university were randomly selected as research subjects, and 42 each of the experimental and control groups were randomly selected to study the effects of dormitory living environment on academic stress relief and mental health. Academic stress was assessed by force scores, cortisol levels, and average daily hours of focused study, and psychological health was chosen to be assessed by depressive symptoms, anxiety levels, perceived social support, and sleep quality. The results showed that in the analysis of college students' academic stress, the stress score of the experimental group decreased to (3.94±1.27) after the modification of college students' dormitory living environment, and the change was significantly higher than that of the control group. In the mental health test, depressive symptoms, anxiety levels, perceived social support, and sleep quality were significantly improved. This suggests that this paper transforms the dormitory living environment through the partition of function, color and lighting, storage and greenery, socialization and privacy, and intelligent design, which can effectively improve academic stress and promote the mental health of college students.

Funding

This research was supported by the Research Project on Teaching Reform at the School Level of Hunan Institute of Technology in 2024: A Study on the Teaching Mode of Enhancing College Students' Digital Literacy through Mental Health Courses in the Context of the Artificial Intelligence Era. 2024 Hunan Provincial Universities Ideological and Political Work Quality Improvement Project Funded Project: Research on the Psychological Mechanism Analysis and Intervention Path of College Students' Invisible Truancy Phenomenon (24C34).

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