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THE IMPACT OF POST-PANDEMIC LIVING ENVIRONMENT ON STUDENTS' WELLBEING IN STUDENT ACCOMMODATION

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Abstract

The COVID-19 pandemic has emphasised the significance of healthy housing and residential environments in promoting health, comfort, and wellbeing. Previous research conducted in China revealed notable effects on students' psychological wellbeing, with increased anxiety levels attributed to the pandemic. In Malaysia, student accommodation-based institutions have experienced a sharp rise in COVID-19 clusters since the reopening of schools. However, there is a lack of research investigating the influence of spatial design qualities on students' psychological wellbeing. Therefore, this study aimed to investigate how the living environment in student accommodation affected students' overall wellbeing following the pandemic. By analysing factors such as spatial design qualities, furniture conditions, lighting, ventilation, and shared spaces, this research aimed to identify aspects of the living environment that contributed to students' psychological wellbeing. A questionnaire survey was conducted to collect participant data, and descriptive statistical analysis was employed to examine the responses. Key findings indicated that spatial design qualities significantly contributed to students' wellbeing. The findings demonstrated that students in the study's student accommodation experienced positive wellbeing, which can be attributed to the comfortable living environment with sufficient lighting and ventilation.

Keywords: Living environment, Post-pandemic, Student accommodation, Spatial design qualities, Wellbeing.

1. Introduction

The COVID-19 pandemic has posed unprecedented challenges to the student accommodation sector in Malaysia. As the country entered the post-pandemic period, addressing emerging student accommodation-related issues and their impact on student wellbeing became crucial. In January 2022, The Star (2022) reported Covid-19 clusters in educational institutions shortly after schools reopened, primarily affecting boarding schools [1]. Health experts identified dormitories as the main breeding ground for the virus. Student accommodation was only partially occupied during the Recovery Movement Control Order (RMCO) from June 10 to December 31, 2020 [2].

Student accommodation is vital in providing essential amenities and facilities, ensuring a secure and conducive study environment while fostering student relationships and friendships [3]. A well-equipped student accommodation includes study and sleeping bedrooms, shared bathrooms, kitchens, laundry areas, leisure spaces, and easy access to internet services [4]. Therefore, student accommodation significantly contributes to the overall university experience for students.

The post-pandemic period has raised several issues related to student accommodation in Malaysia, including concerns about design quality, living conditions, and the ability to ensure students' safe and healthy environment. The sudden shift to remote learning and subsequent return to on-campus activities have resulted in varying conditions of student accommodation, potentially leading to inadequate infrastructure, overcrowding, and insufficient sanitation facilities [1].

Population density played a crucial role in the spread of Covid-19, raising concerns about student accommodation and the increasing student population. Maintaining safe physical distancing became challenging in dormitories where many students lived together. Social activities, shared meals, and using common areas such as stairs, washrooms, study spaces, and lounges naturally brought students together.

The challenges faced by students in the post-pandemic student accommodation context had significant implications for their wellbeing. Inadequate living conditions, including limited personal space and insufficient access to amenities, increased stress, anxiety, and decreased student satisfaction [5, 6]. Limited social interactions and difficulties in maintaining physical distancing within shared spaces added to the challenges faced by students [7].

The return of fully vaccinated students to Malaysian campuses resulted in varying conditions in student accommodation, potentially leading to inadequate infrastructure and overcrowding. The study focused on Subang Jaya as the study area, examining the design qualities of existing student accommodations to ensure a healthy living environment and prevent psychological issues among students [8]. Congested living environments and student social gatherings contributed to the rapid spread of COVID-19 within university campuses. Poor ventilation in crowded dormitories increases the risk of respiratory and infectious diseases [9]. Understanding the relationship between spatial design and disease transmission, particularly in workplace settings, is crucial [10]. While studies have highlighted psychological distress among UK university students, there is limited evidence regarding the wellbeing of Malaysian students, particularly in the post-pandemic period [11].

Addressing student accommodation-related issues in Malaysia is essential to ensure students' wellbeing and academic success. Creating safe and supportive living environments with adequate design qualities, such as lighting, ventilation, and comfortable furnishings, was crucial for promoting positive mental health and overall wellbeing [12, 13]. Additionally, measures needed to be implemented to address concerns related to overcrowding, access to essential amenities, and the provision of adequate sanitation facilities.

This study aimed to investigate the impact of spatial design qualities in student accommodation on the psychological wellbeing of Malaysian students in the post-pandemic environment.

1.1. Environmental psychology

Environmental psychology research has emphasised the influence of design and features in student accommodation on students' mood, behaviour, and overall wellbeing [12, 13]. Adequate natural and artificial lighting has been shown to positively impact mood and productivity, while proper ventilation contributes to a comfortable and healthy living environment. Additionally, good ventilation has been linked to improved cognitive performance and overall satisfaction [14].

Shared spaces within student accommodation play a crucial role as social hubs, influencing factors such as comfort, privacy, and social interaction. Designing shared spaces that effectively balance privacy and opportunities for social engagement promotes positive social interactions and fosters community among residents. The principles of environmental psychology highlight the importance of aligning the design and features of student accommodation with the psychological needs of students. By creating supportive and aesthetically pleasing living environments, student accommodation can enhance students' overall wellbeing, academic performance, and satisfaction [12].

1.2. The effects of student accommodation living environment on student wellbeing

The quality of student housing facilities is crucial for students' wellbeing and productivity. Educational institutions depend on these facilities to provide students with a healthy, secure, comfortable, and motivating environment [15]. The "student home" idea should consider the lived space and its impact on social interactions and future accommodation preferences [16]. Comfort and safety in student accommodation can affect academic performance [17]. However, shared rooms and standard facilities may lead to privacy and health safety concerns during the pandemic. Student housing serves as a gathering place for social and recreational activities, but maintaining physical distancing has been challenging [18]. Fixed guidelines in university student accommodations limit changes to enhance the living environment's comfort during the pandemic [19].

The impact of the living environment in student accommodation on student wellbeing has been extensively studied. Previous research has examined various factors, including spatial design qualities, furniture conditions, lighting, ventilation, and shared spaces. Well-designed living environments positively influence students' mental health and wellbeing, with lighting and ventilation playing a crucial role [20]. Jones and Johnson [5] highlighted the importance of comfortable

furniture in promoting student wellbeing, as uncomfortable furniture can lead to increased unease and dissatisfaction.

Studies have also explored the relationship between the built environment and depressive mood, emphasising the need for resilient indoor and outdoor spaces [21]. D'Alessandro et al. [22] underscored the significance of green elements, thermal comfort, indoor air quality, and adaptability in future living spaces for wellbeing and public health. The physical attributes and functionalities of the built environment are closely linked to individuals' personality traits, making it essential to analyse the relationship between the built environment and wellbeing.

Valizadeh and Iranmanesh [23] emphasised the importance of balconies, voids, and open areas in residential design, while Ribeiro et al. [24] highlighted the role of balconies in enhancing comfort for those spending extended periods indoors. Wang et al. [25] stressed the significance of accessible green spaces for physical and mental wellbeing. Nediari, Roesli, and Simanjuntak, [26] raised concerns about the effectiveness of standard physical distancing guidelines; suggested the need for sustainable space designs to address potential future pandemics.

Aslanoğlu et al. [27] emphasised the role of daylighting in improving visual comfort, productivity, and individual wellbeing. Megahed and Ghoneim [28] further highlighted the positive impact of daylight, ventilation, and exposure to plants on psychological wellbeing during the pandemic. Hipwood [29] stressed the significance of thermal comfort and energy efficiency in residential settings, while Dietz et al. [30] underscored the importance of indoor air quality and the built environment in pandemic prevention. Gür [31] advocated incorporating spatial scales and design features, such as visible and accessible green spaces, to achieve healthier and safer housing.

The impact of architectural spaces and confinement on wellbeing has been extensively studied, and the concept of mass population quarantine and isolation has further magnified the adverse effects on the community [32]. It is crucial to consider these factors and improve the built environment to promote positive wellbeing.

2. Research Methodology

This study employs a quantitative research methodology, utilising survey questionnaires as the main data collection tool. The survey questions are informed by a thorough literature review on student living environments, with a specific focus on post-pandemic conditions and students' psychological wellbeing. The literature review serves as the basis for developing an analytical framework for data collection. The structured questionnaires consisted of close-ended questions tailored to gather data from students residing in the selected student accommodation.

2.1. The study sample and site

The study focused on Subang Jaya, Malaysia, and targeted students from a highly populated private university. However, due to the implementation of hybrid classes, only half of the student accommodation was occupied during the study. The sample size for the study was determined using Krejcie and Morgan's [33] sample size method, which indicated a target of 265 participants. However, the study could only collect and analyse data from 102 participants.

2.2. Study instrument

The instrument used in this study consisted of three sections: Section A, Section B, and Section C. Section A gathered demographic information and assessed participants' wellbeing in the post-pandemic period. Section B examined window openings, physical conditions, basic facilities, colours, and materiality to understand spatial requirements and the built environment's impact on student accommodation. Lastly, Section C focused on psychological wellbeing, including participants' opinions and perceptions. This section comprised 11 questions related to the design qualities of their living environment.

3. Results and Discussion

This section presents the findings of the study obtained from the questionnaire survey. The table below displays the analysis of participants' demographic information and other factors.

3.1. Demographic data

The total number of respondents in the study was 102 students residing in the student accommodation. The findings revealed a significant gender difference, with 66.7% of respondents being female and 33.3% male (see Table 1). The majority of participants were undergraduate students (52.9%), followed by postgraduate students (31.4%) and pre-university students (15.7%). Regarding daily activities, 49% of students reported staying in their rooms for half of the day, while 43.1% stayed in their rooms the entire day. Only 7.8% of students remained in their rooms for 1-3 hours.

Regarding concerns about the pandemic, 38.2% of students agreed that they were concerned, 34.3% disagreed, and 27.5% were undecided. The most frequently used space in the student accommodation was the bedroom (73.5%), followed by the dining room (33.3%) and the kitchen (28.4%). The shared lounge was infrequently utilised by the majority of students (30.3%).

Table 1. Descriptive data of Demographic data.

		Numbers	%
Gender	Male	68	66.7
	Female	34	33.3
Education Level	Pre-U (A-levels/SACE/Foundation)	17	15.7
	Undergraduate (Diploma, Degree)	53	52.9
	Postgraduate (Master)	32	31.4
Hours spent in the room daily	1 hour - 3 hours	8	7.8
	half-day long	50	49
	all day long	44	43.1
Pandemic concern	Yes	39	38.2
	No	35	34.3
	Maybe	28	27.5
Most used spaces in student	Bedroom		

accommodation after the pandemic			
	Never	1	0.9
	Rarely (Once a month)	4	3.9
	Occasionally (Once a week)	11	10.7
	Frequently (More than once a week)	11	10.7
	Very Frequently (Almost every day)	75	73.5
	Dining Room		
	Never	8	7.8
	Rarely (Once a month)	11	10.7
	Occasionally (Once a week)	23	22.5
	Frequently (More than once a week)	34	33.3
	Very Frequently (Almost every day)	26	25.4
	Kitchen		
	Never	4	3.9
	Rarely (Once a month)	16	15.6
	Occasionally (Once a week)	26	25.4
	Frequently (More than once a week)	29	28.4
	Very Frequently (Almost every day)	27	26.4
	Shared Lounge		
	Never	10	9.8
	Rarely (Once a month)	31	30.3
	Occasionally (Once a week)	27	26.4
	Frequently (More than once a week)	23	22.5
	Very Frequently (Almost every day)	11	10.7

3.2. Spatial design qualities

As shown in Table 2, the highest percentage of students (30.4%) described their room's physical condition as old with renovation, followed by 24.5% considering it as old without renovation. A slightly lower percentage (23.5%) described their room as new with renovation, while the lowest percentage (21.6%) reported it as new without renovation. Regarding furniture sizes, 72.5% of students found them acceptable and non-restrictive, 17.5% considered them small with limited movement space, and 10% felt they had large furniture that limited their room. In terms of green spaces, 57.8% of students reported having a view of them from their rooms, while 42.2% did not. Regarding visual comfort, 79.2% described their room's colour as under a light tone, 16.85% as dark, and 4% bright. In relation to social measures, 72.5% of students answered 'yes,' while 27.5% answered 'no.'

The study also revealed that most students, regardless of whether they were occupying single or twin rooms, preferred larger room sizes, with percentages of 66.7% and 67.2%, respectively. In terms of room selection, 90% of students opted for single rooms, citing concerns related to the pandemic, while only 10% expressed a willingness to share a room with others.

Table 2. Descriptive data of spatial design qualities.

	Items		**Numbers**	**%**
1	Physical condition of the room	Old with renovation	31	30.4
		Old without renovation	25	24.5
		New with renovation	24	23.5
		New without renovation	22	21.6

2	Furniture sizes	Large and restricting movement in the room	11	10
		Small and less restricted movement in the room	18	17.5
		Acceptable, not restricting	73	72.5
3	Green open spaces visible	Yes	59	57.8
		No	43	42.2
4	Wall colour of the room	Bright colour tone	4	4
		Light colour tone	80	79.2
		Dark colour tone	17	16.8
5	Wall colour of shared areas	Bright colour tone	7	6.9
		Light colour tone	76	75.2
		Dark colour tone	18	17.8
6	Social distancing measures are implemented in shared spaces	Yes	74	72.5
		No	28	27.5
7	Sizing preference for single rooms	Size variation 1 (smaller)	31	33.3
		Size variation 2 (bigger)	62	66.7
8	Sizing preference for twin-sharing rooms	Size variation 1 (smaller)	39	67.2
		Size variation 2 (bigger)	19	32.8
9	Preference of room type after the pandemic	Shared	9	10
		Single	81	90

Table 3 presents the mean and standard deviation of the Likert scale responses, indicating the satisfaction levels of the respondents regarding spatial design qualities. The scale ranged from 1 (Strongly disagree) to 5 (Strongly agree). A mean value above 3 suggests that the majority of respondents are satisfied with the living environment in the student accommodation, while the standard deviation reflects the variation in the data. Multiple mean analyses were conducted to assess the level of agreement among house owners or occupants with energy retrofits. For the discussion of the study's findings, the scoring was categorised into three main interpretation levels: low (1.00 to 2.33), moderate (2.34 to 3.66), and high (3.67 to 5.00).

The respondents reported moderate satisfaction with the student accommodation's design qualities, comfort, and convenience ((Table 3). They expressed the highest level of satisfaction with daylighting (mean = 3.65, SD = 0.875) and the lowest level of satisfaction with acoustical comfort (mean = 2.35).

Table 3. Satisfaction with the student accommodation living environment.

	Items	**Mean (M)**	**Standard Deviation (SD)**
1	The condition of the furnishings in my room is good	3.40	0.994
2	Daylighting in the room adequate	3.65	0.875
3	Ventilation in the room is adequate and comfortable	3.45	0.998
4	Acoustical quality in the room	2.35	1.136

3.3. Student's psychological wellbeing

Table 4 presents the results of the students' psychological wellbeing levels. The mean score (M = 3.45) indicates that most students are in a positive state. The students strongly agreed (M = 4.15) that furniture sizes affected the spaciousness of their rooms. Additionally, they felt comfortable (M = 3.75) with the condition of the furniture in their rooms. The students scored moderately (M= 2.55) in terms of their preference for open spaces in their living environment. However strongly preferred daylighting in their rooms (M = 4.45), and there is adequate ventilation in their rooms (M= 3.30). The students are generally satisfied with the colours of their rooms (M = 3.68) and the shared spaces (M = 3.73). Lastly, they feel safe (M = 3.05) interacting with other occupants without social distancing measures in the student accommodation.

Table 4. Descriptive statistics of factors related to wellbeing in student accommodation living environment.

	Statement	Mean	Standard deviation
1	Please rate your current emotional state on a scale of 1-5.	3.45	0.887
2	The size of the furniture is important as it affects the room's spaciousness	4.15	0.875
3	I am comfortable with the physical condition of the furniture in the room	3.75	1.208
4	Sharing furniture with other residents made me feel uneasy during the pandemic period	3.71	1.002
5	I prefer to use open spaces like balconies, parks, or gardens in my student accommodation to relax	2.55	0.871
6	I prefer staying in a room with daylight compared to artificial lighting.	4.45	0.686
7	The ventilation in my room is adequate (comfortable)	3.30	1.031
8	On a scale of 1-5, rate your mood based on the colour your room is painted.	3.68	0.885
9	On a scale of 1-5, rate your mood based on the colour the shared spaces are painted.	3.73	0.805
10	Rate how safe you feel talking to other occupants without social distancing measures.	3.05	1.311

4. Discussion

The study results indicate that materiality, shared spaces, window openings, and spaciousness in student accommodation positively impact users' comfort and psychological wellbeing. The study revealed a moderate level of satisfaction and agreement with the current state of student accommodation. Despite some units being described as old with renovation, the students find the furniture sizes acceptable and do not feel cramped in their rooms. This aligns with the findings of Abdulaali et al. [20], which suggest that well-designed living environments positively influence students' wellbeing. The study suggests that the furnishing condition of student accommodation is adequate and does not impose restrictions on the residents.

The student accommodation successfully met the criteria for an ideal built environment, as evidenced by students reporting the presence of green spaces

nearby. The study by Najem et al. [34] and Megahed and Ghoneim [28] supported the positive impact of integrating landscape design and green spaces on mental health. Materiality, including the use of materials and colour scheme, contributed to visual comfort, with most students expressing satisfaction with light-toned rooms and shared spaces. Additionally, the data indicated a preference for larger rooms among the residents. This aligned with the research by Valizadeh and Iranmanesh [23] and Wang et al. [25], which emphasised the importance of open spaces such as balconies and green spaces and spacious areas, especially for bedrooms, given their significance in students' daily lives, particularly during and after the pandemic. The study further highlighted the potential impact of limited open and flexible spaces on the wellbeing and comfort of university students.

The respondents reported moderate daylight levels in their rooms (M = 3.65). Daylighting is crucial in enhancing visual comfort and individual wellbeing in indoor environments. Considering Malaysia's climate, the study findings suggest that the student accommodation provides satisfactory daylighting levels. Students preferred naturally lit rooms over artificially lit ones (M = 4.45), aligning with previous research on the positive effects of daylighting on wellbeing [27, 28].

The students indicated moderate satisfaction with the ventilation in their rooms (M = 3.45). This highlights the importance of good ventilation for their comfort and satisfaction, consistent with the emphasis on thermal comfort and indoor air quality for promoting wellbeing [22]. As for the acoustical quality, the students reported relatively low satisfaction (M = 2.35) with aspects such as privacy and noise levels. This finding aligns with previous studies that emphasise the impact of poor housing quality and noise pollution on student wellbeing and mood [21].

Furthermore, the students preferred open spaces such as parks, gardens, and balconies for relaxation. These findings support previous research highlighting the significance of open spaces and green areas in enhancing comfort and wellbeing [23-25]. The study also emphasises the importance of natural light and ventilation for maintaining positive psychological wellbeing, especially during the pandemic [28].

Overall, the findings indicate a positive relationship between spatial design qualities, such as daylighting, ventilation, and access to open spaces, and students' satisfaction and wellbeing in their accommodation.

5. Conclusion

This study investigated students' satisfaction and wellbeing by evaluating their living environment in student accommodation post-pandemic. A total of 102 students staying in student accommodation participated, and their data was analysed to examine the factors of spatial design quality that affect students' psychological wellbeing in terms of comfort, convenience, and safety.

Key findings indicate that spatial design qualities significantly contribute to students' wellbeing. The data demonstrated that students in the study's student accommodation experienced positive wellbeing, which can be attributed to the comfortable living environment with sufficient lighting and ventilation. These findings align with the importance of natural light and good ventilation in the post-pandemic context, addressing concerns about Covid-19 transmission and reducing fear associated with indoor spread.

Overall, the study emphasised the impact of the living environment on students' psychological wellbeing, highlighting the significance of spatial design qualities. The study concluded that most students experienced positive psychological wellbeing, primarily due to their satisfaction with spatial design qualities such as colour, materials, and furniture conditions.

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