

# Naturalized Decorations for HSCT Ward Environments at Peking University First Hospital

ZHANG Yifan, WANG Xiaobo\*, DENG Huiwen

(North China University of Technology, Beijing 100144, China)

**Abstract** The haematopoietic stem cell transplantation (HSCT) ward serves as a temporary residence for patients following their surgical procedures, necessitating adherence to rigorous aseptic standards. However, the current atmosphere within these wards frequently contributes to feelings of depression among patients. Research indicates that a restorative environment has the potential to alleviate negative emotional states in individuals. This study utilized the HSCT ward of Peking University First Hospital as a case study to examine the decorative preferences. This investigation was conducted through a questionnaire that was informed by the patients' inherent preferences and insights derived from research on restorative environments. The results indicated that the incorporation of floral decorations, particularly those resembling sunflowers, in ward corridors, communal activity areas, and walls can significantly enhance patients' sense of hope. Additionally, it is essential to improve the environmental visual experience in the nurses' lounge and demonstration rooms for medical staff.

**Keywords** Natural decoration, Ward environment, HSCT ward, Restorative environment, Decoration preference

**DOI** 10.16785/j.issn 1943-989x.2024.5.013

The ongoing advancements in both the medical and architectural fields have garnered significant attention regarding the utilization of the environment to enhance individuals' physical and psychological issues. Numerous studies have demonstrated that, alongside biological factors, the etiology of human diseases, the psychological state of an individual, and socio-environmental influences are critical components in the onset, progression, outcomes, and recovery from human diseases<sup>[1]</sup>. This research has yielded new perspectives and ideas for this study. However, despite the advancements achieved, restorative environmental improvements in haematopoietic stem cell transplantation (HSCT) wards remain largely unexplored. This study enhances the ward environment through the incorporation of natural decorations in HSCT wards, thereby mitigating negative emotions.

## 1 Preliminary survey and re-search

### 1.1 Status of wards

HSCT is the most effective therapeutic intervention for haematological malignancies, with the objective of restoring the haematopoietic and immune functions of patients<sup>[2]</sup>. Nevertheless, pathogenic bacterial infections constitute the most prevalent complication associated with this procedure, resulting in high mortality rates. Consequently, patients diagnosed with this disease are required to be admitted to laminar flow sterile wards for a

minimum duration of 30 d, as the standards for maintaining an aseptic environment in these wards are exceptionally stringent<sup>[3]</sup>.

During the field study, it was observed that the HSCT ward at Peking University First Hospital was outdated and closed, characterized by a somber atmosphere, inadequate lighting, elongated and narrow corridors, limited ward space, absence of natural light, and the presence of clutter in the hallways. These conditions contributed to negative emotional experiences for both patients and their family members. Although the communal rest area was spacious and well-lit, efforts to cultivate a cozy atmosphere were ultimately unsuccessful (Fig.1).

Furthermore, it has been observed that medical staff, patients, and their family members frequently encounter feelings of anxiety, depression, isolation, and fear<sup>[4]</sup>.

### 1.2 Restorative environmental theory

A restorative environment is defined as one that replenishes and rejuvenates the physical and mental resources and capacities that are continually diminished. Kaplan identified the characteristics of restorative environment as distance, consistency, charisma, and compatibility<sup>[5]</sup>. The associated theories encompass psychological stress reduction theory and attention restoration theory. Ulrich posits that environmental stimuli serve as the principal determinants of emotion. Attention restoration theory contends that individuals must exert conscious attention to remain cognizant of their surroundings, a process that

depletes the body's energy reserves and results in diminished attention capacity and weakened stress response<sup>[6]</sup>.

Restorative environments facilitate various beneficial behaviors in humans, including positive changes in emotion, enhancements in directed attention tasks, and reductions in autonomic arousal levels. Numerous studies indicate that natural landscapes, or those characterized by natural features, are frequently perceived as more restorative compared to urban or artificial landscapes. Furthermore, natural green spaces have been shown to alleviate cognitive fatigue and promote perceptual recovery<sup>[7]</sup>.

### 1.3 Naturalized decorative options

An exploratory questionnaire, which included the IPA questionnaire, was developed to evaluate the environmental decoration in HSCT wards. This questionnaire was informed by patients' inherent preferences within HSCT wards as well as research findings related to restorative environments. Convenience sampling was employed to select patients, family members, and medical staff from the hematology department's HSCT ward at Peking University First Hospital. Respondents were chosen based on their fulfillment of the eligibility criteria during the period from September to December 2023.

The questionnaire comprised three components: basic information regarding the respondents, ranking of eight dimensions of decorative preferences (including three environmental



**Fig.1 Status of wards**

decorative spaces and themes, emotional responses), and an IPA questionnaire designed for individuals utilizing various locations. A total of 58 valid questionnaires were collected, and the resulting data were analyzed using SPSS 25.

## **2 Questionnaire analysis**

### **2.1 Descriptive statistical analysis**

The sample comprised 65.5% female respondents and 34.5% male respondents, with a predominant age range of 30 to 50 years. Among the respondents, discharged patients represented the largest proportion at 36.2%, followed by nurses at 24.1% and family members of patients at 22.4% (Table 1).

### **2.2 Demand analysis for naturalized decoration**

**2.2.1 Theme preference of naturalized decoration.** The questionnaire presented nine themes for respondents and ranked the top seven preferred themes (Table 2). Among these, the theme of living in the sun was the most favored, representing 65.5% of the total responses. This was followed by the themes of forest secret area (25.9%) and quiet countryside (27.6%). The findings suggest that floral decorations, particularly sunflowers, are suitable for use in ward decoration, while decorations inspired by aquatic environments such as oceans, lakes, waterfalls, and streams should be avoided.

The selected themes were subjected to cross-analysis in relation to the respondents' identities, and the findings aligned with those presented in Table 2.

**2.2.2 Perception preference of ward environment.** In the administered questionnaire, respondents were presented with eight distinct types of perceptions, and the top seven preferred perceptions were subsequently ranked (Table 3).

The findings revealed that sense of hope was the most favored perception, comprising 34.5% of the total responses. Vitality ranked third with a percentage of 29.3%, and it also appeared in the seventh position with a percentage of 25.9%. This suggests that while the perception of vitality is significant, it is essential to exercise moderation in its expression.

In relation to the theme ranked first, six of the discharged patients and four of the nurses expressed a preference for a sense of hope, warmth, and comfort, respectively. This indicates that incorporating natural decorations that embody these qualities should be considered for the environments utilized by both patients and nurses.

In relation to the theme ranked seventh, it was indicated that the least significant factors to be considered in the used space by patients, their family members, doctors, and nurses were a sense of security, calmness, peacefulness and coziness, and vitality.

**2.2.3 Preference of natural landscape.** The questionnaire presented eight types of natural landscapes to the respondents and ranked the top seven preferred types (Table 4). Among these, botanical landscapes emerged as the most favored, with a preference rate of 27.6%. This was followed by forest landscapes and waterfront landscapes, each receiving a preference of 22.4%. In contrast, landscapes featuring docile animals were the least preferred, with a preference rate of 41.4%. The findings indicated that respondents exhibited a greater preference for botanical landscapes, including elements such as leaves, fruits, flowers, and branches. Conversely, a majority of respondents expressed a dislike for docile animal landscapes, which encompassed butterflies, birds, fish, monkeys, and horses.

According to the theme ranked first indicated in Table 5, discharged patients exhibited a preference for meteorological climates and botanical landscapes. In contrast, family members and nurses favored rural landscapes, while doctors showed a preference for hydrological landscapes. Therefore, the patient area is appropriate for decorative elements such as wind, frost, rain, snow, as well as flowers, fruits, and various plants. The family member and nurse space is well-suited for terraces, wheat fields, and other rural landscapes. The doctor's space can be decorated with hydrological landscapes, including rivers, lakes, and seas.

**2.2.4 Position preference of naturalized decoration.** The questionnaire presented respondents with 17 naturalized decorative options, subsequently ranking the top seven preferred decorative positions (Table 6). The findings indicated that the entrance corridor was the most favored area for decoration, with 44.8% of respondents expressing a preference for it. This was followed by the corridor of the out-of-cabin wards (1-bed-8-bed area), which garnered 34.5% of preferences. Conversely, the blood cell separation room (blood collection room), the visiting corridor and the bay window of in-cabin wards were the least preferred options, receiving only 12.0% of the responses.

**2.2.5 Specific location preference of naturalized decoration.** The questionnaire presented respondents with ten specific locations for naturalized decorations and ranked the top seven preferred locations (Table 7). The results indicated that the demand for wall decorations was the highest at 77.6%, followed by ceiling decorations at 27.6%. In contrast, the preferences for ward and bathroom doors were the lowest, recorded at 31.0%, while the preference for cabinet doors

**Table 1 Descriptive statistical analysis**

Item		Number of people	Percentage//%	Effective percentage//%	Cumulative percentage//%
Gender	Male	20	34.5	34.5	34.5
	Female	38	65.5	65.5	100.0
Identity	Out-of-cabin patient	1	1.7	1.7	1.7
	In-cabin patient	1	1.7	1.7	3.4
	Discharged patient	21	36.2	36.2	39.7
	Family member of discharged patients	13	22.4	22.4	62.1
	Doctor	5	8.6	8.6	70.7
	Nurse	14	24.1	24.1	94.8
	Care worker	2	3.4	3.4	98.3
	Other personnel	1	1.7	1.7	100.0
Age//years old	20-29	12	20.7	20.7	20.7
	30-39	17	29.3	29.3	50.0
	40-49	16	27.6	27.6	77.6
	50-59	10	17.2	17.2	94.8
	60 and above	3	5.2	5.2	100.0

**Table 2 Frequency of theme selection**

Rank	Type of theme	Response		Percentage of cases//%
		Number of cases	Percentage//%	
1	Living in the sun (decorations featuring sunflowers and other flowers)	38	65.5	65.5
2	Forest secret area (decorations featuring jungle trees)	15	25.9	25.9
3	Quiet countryside (decorations featuring fields, mountains and hills)	16	27.6	27.6
4	Vitality (animal-based decorations)	11	19.0	19.0
5	Bright stars (star-based decorations)	12	20.7	20.7
6	Magnificent water (decorations featuring oceans, lakes, waterfalls, and streams)	15	25.9	25.9
7	Magnificent water (decorations featuring oceans, lakes, waterfalls, and streams)	18	31.0	31.0

**Table 3 Frequency of perception preference**

Rank	Type of theme	Response		Percentage of cases//%
		Number of cases	Percentage//%	
1	Sense of hope	20	34.5	34.5
2	Sense of hope	19	32.8	32.8
3	Vitality	17	29.3	29.3
4	Sense of security	11	19.0	19.0
5	Sense of pleasure	16	27.6	27.6
6	Sense of pleasure	16	27.6	27.6
7	Vitality	15	25.9	25.9

**Table 4 Frequency of natural landscape preference**

Rank	Type of theme	Response		Percentage of cases//%
		Number of cases	Percentage//%	
1	Botanical landscapes (leaves, leaf buds, fruits, flowers, branches, moss, flowering trees, petals, etc.)	16	27.6	27.6
2	Forest landscapes (coniferous forests, broadleaf forests, mixed forests, tropical rainforests, etc.)	13	22.4	22.4
3	Forest landscapes (coniferous forests, broadleaf forests, mixed forests, tropical rainforests, etc.)	13	22.4	22.4
	Waterfront landscapes (beaches, islands, lakeshores, continents, islets, etc.)	13	22.4	22.4
4	Hydrological landscapes (oceans, rivers, streams, lakes, waterfalls, springs, ponds, glaciers, wetlands, etc.)	12	20.7	20.7
5	Waterfront landscapes (beaches, islands, lakeshores, continents, islets, etc.)	15	25.9	25.9
6	Rural landscapes (terraces, rice paddies, wheat fields, pastures, tea fields, fruit forests, etc.)	13	22.4	22.4
7	Docile animal landscapes (butterflies, birds, fish, monkeys, rabbits, horses, deer, etc.)	24	41.4	41.4

was at 32.8%.

**2.2.6 Presentation preference of naturalized decoration.** The questionnaire presented nine presentations of naturalized decoration to respondents and ranked the top seven preferred options (Table 8). The findings indicated that the preference for murals or wall paintings and furniture stickers was the highest, accounting

for 58.6% of responses, followed by frames at 31.0%. In contrast, the demand for naturalistic curtains, bed drapes, bed linens, and towels was the lowest, with percentages of 27.6% and 22.4%, respectively.

### 2.3 IPA quadrant analysis

The data obtained from the questionnaire encompassed various groups of people in distinct

usage scenarios. Consequently, the questionnaire was initially categorized into two groups. Category I, as illustrated in Fig.2, comprised nine questions pertaining to environmental visual experiences, including those related to the out-of-cabin nurses' station and the out-of-cabin doctors' office environment. The remaining questions were classified under category II, as

depicted in Fig.3. Subsequently, the correlation factors at the indicator level were analyzed utilizing the IPA method.

The findings presented in the IPA quadrant map for category I (Fig.2) indicated that the visual experiences associated with both the out-of-cabin nurse station and the in-cabin nurse

station were situated within the dominant zone, suggesting that these experiences should be preserved. Conversely, the visual experiences related to the doctors' lounge and the out-of-cabin doctor's office fell within the improvement zone, indicating a need for enhancement.

The findings presented in the IPA quadrant

map for category II (Fig.3) indicated that four items, including the ambient colors of out-of-cabin wards, were situated in the dominant zone. Eleven items, such as the environment of the corridor of out-of-cabin wards, were categorized within the maintenance zone. Additionally, four items, including the environmental visual

**Table 5 First-ranking identity crossover**

Type of theme		Your current identity								Total
		Out-of-cabin patient	In-cabin patient	Discharged patient	Family member of discharged patients	Doctor	Nurse	Care worker	Other personnel	
Meteorological and climatic landscapes (wind, frost, rain, snow, sunset glow, moonlight, etc.)	Number	0	1	5	0	0	1	0	0	7
Forest landscapes (coniferous forests, broadleaf forests, mixed forests, tropical rainforests, etc.)	Number	0	0	3	3	0	0	0	0	6
Hydrological landscapes (oceans, rivers, streams, lakes, waterfalls, springs, ponds, glaciers, wetlands, etc.)	Number	0	0	3	2	3	2	0	0	10
Waterfront landscapes (beaches, islands, lakeshores, continents, islets, etc.)	Number	0	0	1	0	0	2	0	0	3
Rural landscapes (terraces, rice paddies, wheat fields, pastures, tea fields, fruit forests, etc.)	Number	0	0	3	5	0	5	0	0	13
Docile animal landscapes (butterflies, birds, fish, monkeys, rabbits, horses, deer, etc.)	Number	0	0	1	1	1	0	0	0	3
Botanical landscapes (leaves, leaf buds, fruits, flowers, branches, moss, flowering trees, petals, etc.)	Number	1	0	5	2	1	4	2	1	16
Total	Number	1	1	21	13	5	14	2	1	58

**Table 6 Frequency of position preference of naturalized decoration**

Rank	Type of theme	Response		Percentage of cases//%
		Number of cases	Percentage//%	
1	Entrance corridor	26	44.8	44.8
2	Corridor of out-of-cabin wards (1-bed-8-bed area)	20	34.5	34.5
3	Communal activity area in the south-east corner of out-of-cabin wards	19	32.8	32.8
4	Out-of-cabin wards	18	31.0	31.0
5	Out-of-cabin nurses' stations (including treatment rooms)	11	19.0	19.0
6	Visiting corridor and bay window of in-cabin wards	9	15.2	15.2
7	Blood cell separation room (blood collection room)	7	12.0	12.0
	Visiting corridor and bay window of in-cabin wards	7	12.0	12.0

**Table 7 Frequency of specific location preference of naturalized decoration**

Rank	Type of theme	Response		Percentage of cases//%
		Number of cases	Percentage//%	
1	Walls	45	77.6	77.6
2	Ceilings	16	27.6	27.6
3	Windows, bay windows, curtains, bed divider curtains	20	34.5	34.5
4	Windows, bay windows, curtains, bed divider curtains	15	25.9	25.9
5	Countertops such as cabinets, tables, etc.	21	36.2	36.2
6	Ward and bathroom doors	18	31.0	31.0
7	Cabinet doors	19	32.8	32.8

**Table 8 Frequency of presentation preference of naturalized decoration**

Rank	Type of theme	Response		Percentage of cases//%
		Number of cases	Percentage// %	
1	Murals or wall paintings, furniture stickers	34	58.6	58.6
2	Frames	18	31.0	31.0
3	Natural decorative ornaments, pendants	31	36.2	36.2
4	Operable blocks or craft materials	13	22.4	22.4
5	Natural style lamps	18	31.0	31.0
6	Naturalistic curtains, bed drapes, bed linens, and towels	16	27.6	27.6
7	Naturalistic curtains, bed drapes, bed linens, and towels	13	22.4	22.4

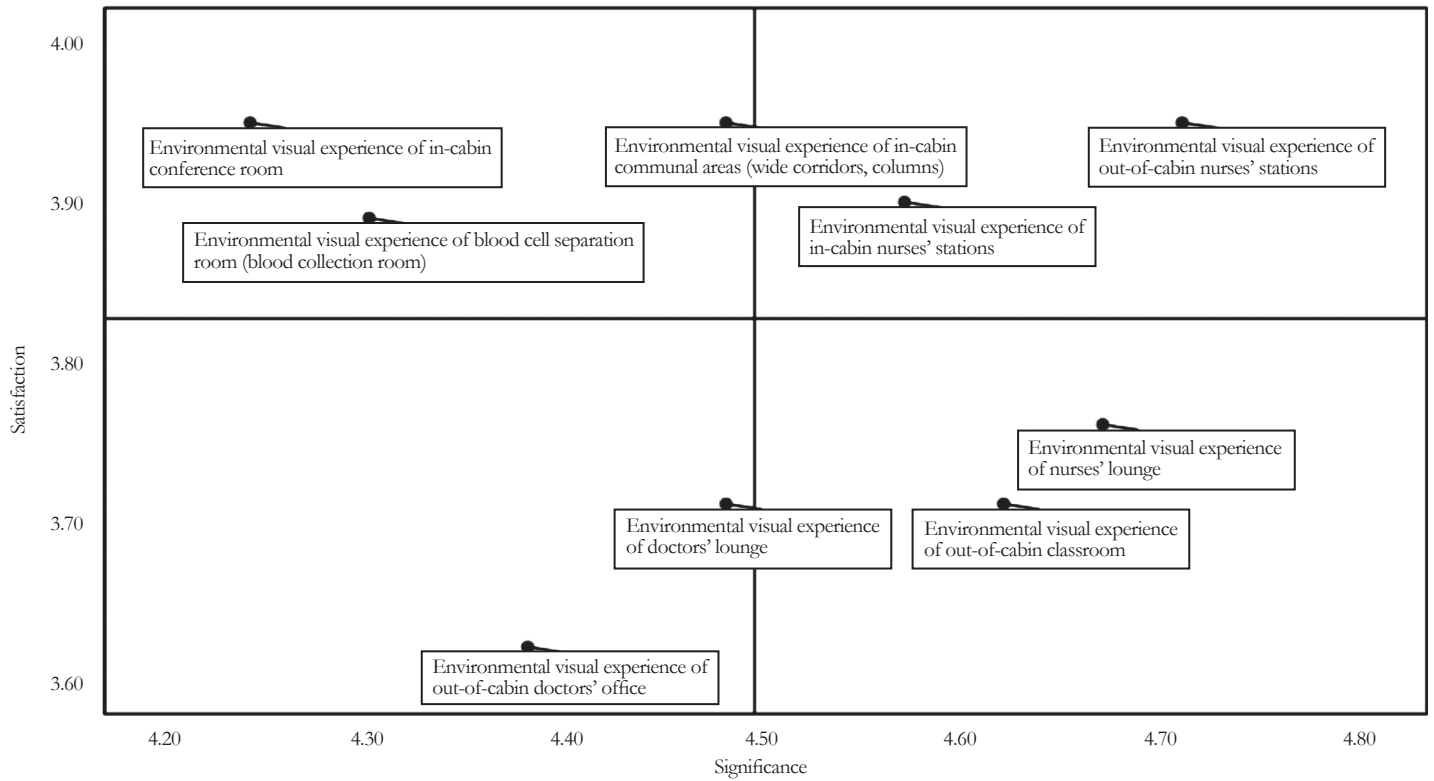


Fig.2 IPA quadrant of category I

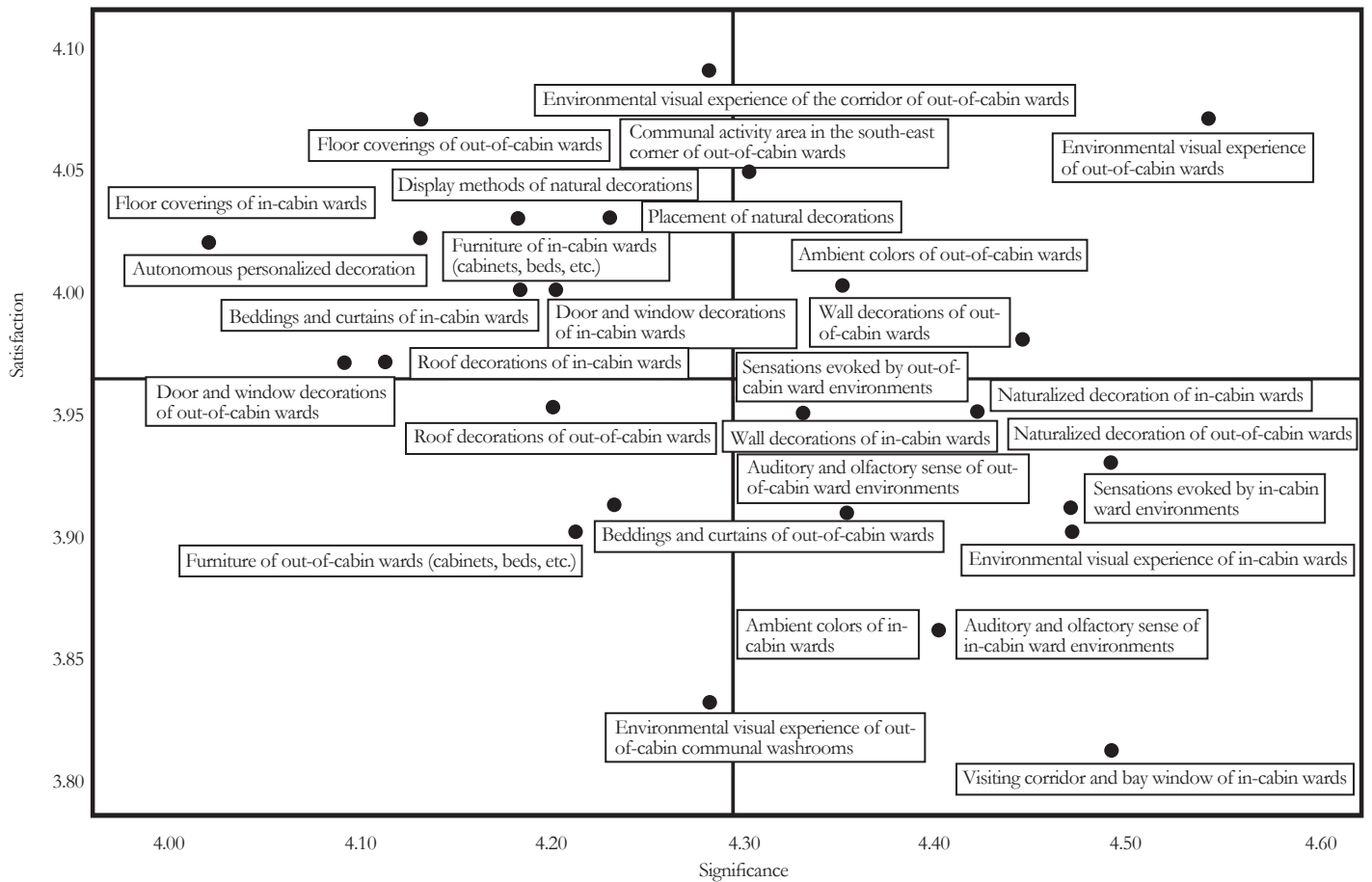


Fig.3 IPA quadrant of category II

(To be continued in P67)



spatial nodes for residents' activities need to be ensured. Therefore, it is essential to improve the community lighting system. It should improve lighting facilities in the main commercial activity areas, main activity nodes, and main traffic road areas within the community. Different lighting fixtures should be chosen for different spaces and functional areas to create different atmospheres.

### 3.5 Creating a public space for cultural exchange

The planning and renovation of old communities require the design of public open spaces with creative elements and diverse green configurations. In urban renewal, the original texture can be considered to form highly recognizable public open spaces<sup>[9]</sup>.

As important cultural venues in cities, colleges and universities are also symbols of cultural identity and spiritual cohesion in urban areas. Colleges and universities have interactions of material space such as demand space interaction and industrial development interaction with their surrounding neighborhoods. In order to better promote emotional and cultural exchanges between universities and neighborhoods, cultural interaction activities can be carried out to allow neighborhoods to experience the cultural atmosphere of universities and expand the influence and sense of identity of colleges and universities. Communities can also collaborate with colleges and universities to carry out

design activities that attract college students to participate in design and renovation, and jointly create creative communities that meet the needs of both parties.

## 4 Conclusions

With the large-scale renewal and renovation activities in the old city area, the communities surrounding colleges and universities in the city are gradually receiving attention. Taking the renovation of communities around colleges and universities as an example, it hopes to help these communities develop in a healthy and harmonious manner through various renewal measures. At the same time, it aims to assist these communities in enhancing their capacity to undertake projects, in order to meet the higher demands placed on them by the development of colleges and universities. Compared to other communities in the city, the surrounding communities of colleges and universities are more distinctive and special. The transformation of the surrounding communities of colleges and universities is not only about renovating and improving the community, but also optimizing and upgrading the spatial quality of the entire area.

## References

- [1] Pan, M. Y., Gao, X. F. & Hu, C. D. et al. (2002). Function and model of university town. *Journal of Higher Education*, (2), 36-41.

- [2] Liu, Z., Wang, S. F. & Mo, Z. J. (2017). Learning from the "gown and town" university town planning: Louvain-La-Neuve, Belgium. *Urban Planning International*, 32(6), 108-115.
- [3] Ren, C. Y. (2003). Discussion on the land use mode of new developing university towns area. *Urban Planning Forum*, (4), 90-92, 94-96.
- [4] Belinda, Y. (1992). Singapore high technology cluster: Origin and present situation. *Journal of Property Research*, 9(3), 247-260.
- [5] Wang, H. L. (2017). *Research on the renewal strategy of the surrounding areas of universities in the old city district* (Master's thesis). Retrieved from China National Knowledge Infrastructure.
- [6] Tu, H. J., Xu, X. Y. & Li, J. Q. et al. (2010). The interactional development of campus rimland and city: Taking the three case studies of Tongji University Guokang Road urban design as an example. *Urbanism and Architecture*, (1), 33-37.
- [7] Cantor, N. (2005). *Collaborations on the creative "campus"* (Master's thesis). Retrieved from China National Knowledge Infrastructure.
- [8] Liu, H. (2015). *Research on the commercial space surrounding open space universities in Changsha region* (Master's thesis). Retrieved from China National Knowledge Infrastructure.
- [9] Wang, L., Wu, Z. Q. & Qiu, S. (2016). Creative community planning in the context of urban renewal: Based on the research on creative class and residential space demand. *Urban Planning Forum*, (4), 54-61.

(Continued from P63)

experience of out-of-cabin communal washrooms, were placed in the opportunity zone. Finally, ten items, such as the auditory and olfactory sense of in-cabin ward environments, were located in the improvement zone.

## 3 Conclusions

In conjunction with the findings of the analysis, it is recommended that the ward's decoration should place greater emphasis on the aesthetic preferences of middle-aged women. The decoration may incorporate floral wall paintings, murals, natural decorative elements, and wall hangings that evoke a sense of hope, such as sunflowers. It is advisable to refrain from utilizing landscape decorations featuring oceans, lakes, or docile animals.

For medical staff, the environmental visual environment of the nurses' lounge and the out-of-cabin classroom should be prioritized in improvement efforts. This improvement

should include the incorporation of botanical landscapes, such as leaves, fruits, flowers, and branches, while avoiding the use of naturalistic curtains, bed linens, and towels<sup>[8]</sup>.

Additionally, natural sounds, such as the rustling of leaves and bamboo, may be played in the ward, and natural fragrances, including flower-scented essential oils, can be utilized without compromising the aseptic environment of the ward.

## References

- [1] Jin, Y. (2024). *Virtual nature for HSCT ward patients intervention material study* (Master's thesis). Retrieved from China National Knowledge Infrastructure.
- [2] Zhang, X. Y., Zhang, R. L. & Jiang, E. L. (2024). The progress of quality of life studies in long-term survivors of hematopoietic stem cell transplantation. *The Journal of Clinical Internal Medicine*, 41(9), 594-596.
- [3] Zhao, D. P. (2015). Sterile room total environmental

protection to prevent infections in bone marrow transplant patients: Nursing management. *The World's Latest Medical Information Digest*, 15(52), 201.

- [4] Cui, M. M., Wang, M. & Liu, J. (2018). Psychological characteristics and nursing strategies of patients undergoing autologous hematopoietic stem cell transplantation. *The World's Latest Medical Information Digest*, 18(97), 229-232.
- [5] Kaplan, R., Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge: Cambridge University Press.
- [6] Zhao, H., Wu, J. P. (2010). Research on theory and evaluation of healing environment. *Chinese Journal of Health Psychology*, 18(1), 117-121.
- [7] Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15, 169-182.
- [8] Yin, H. Y. (2015). Design of decoration painting in hospital ward environment. *Art Science and Technology*, 28(8), 242.