

INFRASTRUCTURE PLANNING AND SPATIAL DESIGN TOWARDS WELL-BEING: AN ENQUIRY ON CUSTODIANS OF YOUTH INSTITUTIONS IN PENANG

Wong Lai Kee ¹, Muhammad Firzan ^{2*}

^{1, 2}*School of Housing, Building, and Planning, Universiti Sains Malaysia, Pulau Pinang, Malaysia*
**Corresponding author's email: firzan@usm.my*

ABSTRACT

Well-being is one of the UN's 17 Sustainable Development Goals (SDG), which has been emphasized by the Convention on the Child's Rights for children below 18. Yet, mental health issues have shown a rapid climb in Malaysia. Acknowledging that mental health, physical well-being, infrastructure planning, and spatial design are intertwining subjects, this study attempts to comprehend the relationship between the psychological influence of physical space on end-users' well-being and to determine the significance of physical space in perpetuating end-users well-being. Also, the study attempts to enlighten the design aspects of physical space that are influential to end-users' well-being. Custodians of Penang youth institutions (involving two juvenile institutions and two orphanage shelters) were probed using semi-structured interviews. The study found that choices of colors, presence of daylighting, utilization of indoor landscape, open spaces concept, ventilation, and sense of privacy are the critical physical aspects to be considered during the early stage of infrastructure planning and spatial design for youth institutions.

Keywords: Health and Well-Being, Infrastructure Design, Juveniles and Orphanages, Living Space, Youth Institutions

1.0 INTRODUCTION

Well-being is one of the UN's 17 Sustainable Development Goals (SDGs). It is also an aspect made central by the Convention on the Rights of the Child for children below 18 years old. Contextually, mental health issues have shown a rapid climb in Malaysia. The National Health and Morbidity Survey in 2019 indicated that the mental illness is the second crucial health issue affecting Malaysians after heart disease (Ganapathy, 2019). The mental health issue is one of the SDGs agendas (Goal 3: Good health and well-being) that hope to be achieved by the year 2030 under the United Nations Development Programme (UNDP) in Malaysia (Department, 2017). Thus, good health is essential no matter of physical and mental health. According to the Mental Health Foundation (2021), although 10% of youths (ages 5 to 16 years old) have clinically diagnosable mental health issues. However, 70% of them who suffer from mental health issues have not received adequate interventions at a moderately early age.

Malaysia's government has constantly been evaluating the local policies regarding our mental health issues, intending to restrain potential mental health illnesses (Ahmad Anas, 2020). Hence, it seems necessary to discover either emotional or physical elements that could influence the mental well-being of youths in Malaysia. These elements could be related to their current living space as previous research has shown that a good home and interior design have been associated with the improvement of mental health and human emotions- through factors such as colour and natural elements (Taylor, 2016).

According to Abbott-Chapman (2015), while designing space for youths, it is crucial to ensure that the area develops a sense of identity and ownership for the occupants. Based on his study, besides youths' bedrooms that guarantee their privacy, they enjoy being in nature, such as beaches and bush. Furthermore, Abbott-Chapman (2015) mentioned that youth institutions should be designed to

provide a chance to develop their physical, social, and emotional abilities to influence their general health positively. Therefore, considering youths' needs while designing youth institutions is crucial as early as the planning stage.

Yeoh et al., (2017) through his research, did identify that the moderate and severe depression rates of ethnic Malays are 11.1% and 10.3%, respectively, while the moderate and severe depression rates of ethnic Chinese are 11.7% and 7.4%, respectively. These two ethnicities are the largest ethnic group in Penang, Malaysia, which might be the potential factor contributing to the results. On another note, juveniles and orphanages are the groups where people are most neglected in our society (Child Abuse and Neglect: What Parents Should Know, n.d., 2022). They do not know how to express themselves and might have been diagnosed with mental issues without understanding, leading to severe conditions such as suicide (Staff, 2022). According to the World Health Organization (WHO) in 2019, the suicide death rate in Malaysia in 2016 was 6.2 per 100000 population. With the awareness that mental and physical well-being, as well as spatial design and architecture, are intertwining subjects, this paper attempts to achieve three objectives as the following:

- i. to comprehend the general relationship between the psychological influence of physical space on end-users' well-being,
- ii. to determine the significance of physical space in perpetuating end-users' well-being and,
- iii. to enlighten on the design aspects of physical space that are influential to end-users' well-being.

Anticipatedly, these objectives would help to shed light on the influence of infrastructure planning and spatial design (physical space) on the mental well-being of youths residing in youth institutions in Penang, Malaysia. Therefore, the subsequent section will elaborate on relevant literature on the design aspects of physical space interrelated to end-users' well-being.

2.0 LITERATURE REVIEW

In 2015, the National Health Morbidity Survey (NHMS) reported that the prevalence of mental health disorders among Malaysian adults and children was 29.2% and 12.1%, respectively (Abdullah, 2017). In 2017, NHMS reported that the prevalence percentages of adolescents suffering from depression are 18.3%, 39.7% suffer from anxiety, and 9.6% of youths experience stress in Malaysia (Institute for Public Health, 2018). A recent NHMS report in 2019 reported that 7.9% of children aged between 5 to 15 had mental health problems, showing an increasing pattern of such cases. This report was established to revitalize Malaysia's healthcare system, emphasizing Non-Communicable Diseases (NCDs) to meet healthcare needs' demands, benefits, resources, and costs (Ganapathy, 2019). In short, depression, anxiety, and stress are the three major mental health disorders that Malaysians suffer the most.

The physical interior environment is a continuously discussed issue to create a better and more comfortable design for youths' well-being. Fricke et al., (2019) pointed out that a building will be more likely to be appreciated if end users' psychological requirements are realized, such as facilities, emotions, etc. The physical environment encompasses architectural elements such as physical layout, furniture, equipment, and visual sensory details such as colour, lighting, etc. These two aspects, with ambient factors, create the interior environment (Bitner, 1990). Thus, in designing a better physical living space for the well-being of youth, several parameters or design elements need to be taken into accounts, such as the choices of colour, daylighting, accessibility to natural elements, outdoor and open spaces, ventilation, and privacy.

2.1 Colour

Ćurčić (2019) has highlighted the significant quality of colors in an interior design of a space that could boost the efficiency of employees, the productivity of student work, and the convalescence period of patients. Using colour will leave an important first impression and mark the last remarkable item we remember. The same quality could apply to juveniles as the colour of the juvenile institution will be their first impression when they are being sent to the institution. A welcoming and warm color is the potential to ease their tension. Mohammad (2013) was in the same opinion as he mentioned that colors are associated with emotions and expressions.

2.2 Daylighting

Baloch et al., (2020) concluded from the study that the presence of daylighting is a crucial aspect while designing a school. According to him, daylighting is significant in enabling powerful children's development and performance in school. Hence, we could say that daylighting improves human performance and youth. Furthermore, Shishegar & Boubekri (2016) described that sunlight is the most influential light source to a human being because it carries a broad spectrum of visible light. Therefore, adequate morning sunlight increases alertness and performance quality for occupants in a space.

2.3 Accessibility to natural elements

Various scholars have suggested that placing plants around people brings multiple benefits (Persiani, 2021; Bak Yao, 2020). Plants help increase concentration and strengthen memory, create happy emotions within occupants, provide healing effects, boost human performance, and improve mental health by reducing stress through therapeutic efficacy. Exposure to nature will positively affect human emotions and promote good psychological reactions; positive mental health will increase drastically (Liu et al., 2021).

2.4 Ventilation

Studies by Avella et al., (2021) believed that fresh air and ventilation are the basic requirements for the healthy growth of children; inducing fresh air to reduce CO₂ concentration is a low-cost way to ensure a healthy living environment. Besides admitting air into interiors, window openings can provide a visual release for youths to learn about the world beyond their own space, promoting positive psychological effects. Increasing the ventilation rate in an interior improves indoor air quality by reducing air pollutants (Mahmoud, 2017). A study by Najafi (2019) suggests that ventilation by window opening in the classroom could reduce the stress and anxiety of female high school students. In addition, ventilation is associated with achieving optimum thermal comfort, which also contributes to occupant's comfort.

2.5 Outdoor and open spaces

Mahmoud (2017) pointed out that the accessibility to outdoor or open spaces helps in relaxation and improve overall health outcome. Outdoors and open spaces such as green spaces (gardens, fields, etc.) encourage physical activities such as exercising, plantings, and so on, helping improve the ability to focus and level of alertness. Studies have shown that direct contact (sitting in a garden, playing on a field) and indirect contact (through a window or opening view) with nature benefit the occupants of a living space. In a broader term covering a residential area, in a more specific time, open spaces and outdoors are the open spaces in private spaces like houses, homes, and dorms—freedom to move freely from indoors or outdoors influences the occupants' positive emotions. The

psychological impact of open spaces indicates the natural environment helps reduce mental issues and maintain the state of well-being of occupants.

2.6 Privacy

According to Architecture+Design Scotland, a personal space such as a bedroom is the most private space for its occupant. Therefore, a good bedroom design that provides sufficient privacy to the younger generation significantly positively affects their mental well-being (Evans, 1973). Furthermore, the extent of activities the occupant could carry out in space influences their psychological conditions (Namazian & Mehdipour, 2013). Thus, the degree of freedom of one can do what they wish in the area contributes to a sense of privacy and provides positive emotional support.

Table 1 Literature summary

Keywords	Criteria	Description	Source
Issues	Mental Health	Malaysia's mental health performance	(Abdullah, 2017), (Institute for Public Health, 2018), (Ganapathy, 2019)
Factors	Design	Good interior space and its influence on occupants	(Corbusier, 1965), (Baghchesaraei, 2015), (Wang, 2016), (Jacobsen, n.d), (Fricke et al., 2019)
	Color	How colour affects one psychologically and its significance	(Ćurčić, 2019), (Mohammad, 2013)
	Daylighting	How sunlight affects one psychologically and its efficiency in promoting a positive behavioral attitude	(Heschong, 2002), (Shishegar & Boubekri, 2016), (Baloch et al., 2020)
	Accessibility to natural elements	How natural elements affect one psychologically and the importance of greenery	(Liu et al., 2021)
	Ventilation	How ventilation rate affects one psychologically and its impact on visual pleasing	(Birdsong, 1990), (Mahmoud, 2017), (Najafi et al., 2019), (Avella et al., 2021)
	Outdoors and Open space	How connecting to the outdoor affects one state of well-being	(Mahmoud, 2017)
	Privacy	Importance of privacy as a design element	(Evans, 1973), (Namazian & Mehdipour, 2013)

Table 1 summarizes the common elements mentioned by various scholars to create a healthy living space for better occupants' behavioral and mental well-being. Hence, the focus of the analysis in this paper is to extend the prescriptions of these design elements and physical conditions in influencing the state of well-being of Penang youths.

3.0 METHODOLOGY

A review of secondary data in the form of precedent studies was further scrutinized to complement the case studies (youth institutions in Penang) to provide in-depth exploration and explanation of phenomena under natural context (Houghton, 2017). The researchers reviewed three precedent studies to complement the primary data sought from case studies as tabulated in Table 2.

Table 2 Research locale

Case Studies	Juvenile Institutions		Orphanage Shelters	
	Asrama Akhlak Paya Terubong	Sekolah Tunas Bakti Teluk Air Tawar	Wisma Yatim Laki-laki	Wisma Yatim Perempuan Islam
Address	Asrama Akhlak Paya Terubong, Pulau Pinang, 11500 Ayer Hitam	Jalan Teluk Air Tawar, 13050 Butterworth, Pulau Pinang	173, Jalan Air Itam, 11400 Ayer Itam, Pulau Pinang	79, Jalan Scotland, 11400 Pulau Pinang, 10450
GPS Coordinate	5°23'23.4"N 100°16'27.9"E	5°28'34.7"N 100°23'02.0"E	5°24'16.9"N 100°17'30.0"E	5°24'41.3"N 100°18'11.8"E
Number of Youth Occupants	24 (10 trainees & 14 detainees)	61	40	60
Custodian Interviewed	Principal	Vice-Principal	Principal	

Although the current study is a part of a larger study that has received the clearance of ethical approval by the Human Research Ethics Committee of USM (JEPeM), none of the youths were probed for the semi-structured interviews in respect of their privacy and safety concerns (COVID-19 pandemic restrictions). Alternatively, the semi-structured interviews were conducted involving a key informant/ interviewee from the respective case study. A total of three custodians from the four purposive sampled juvenile institutions and orphanage shelters in Penang, Malaysia, were involved) as summarized in Figure 1.

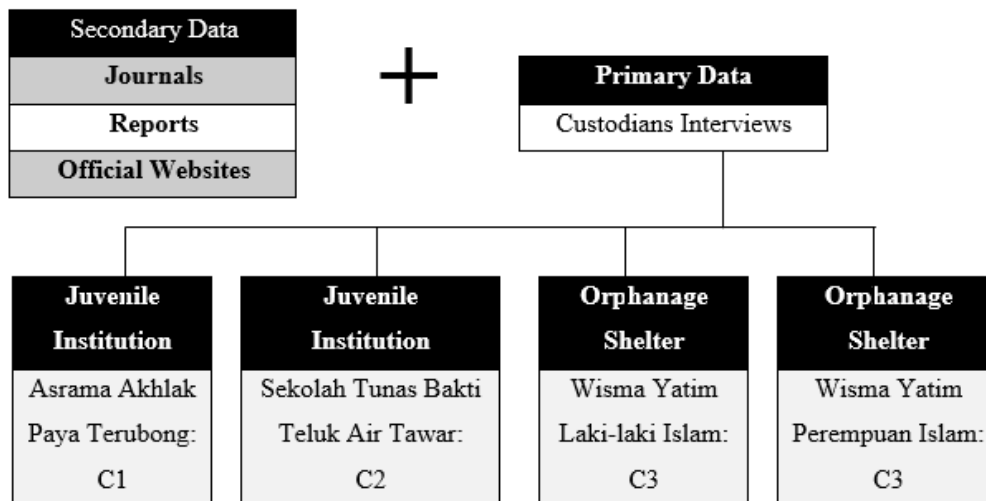


Fig. 1: Process involved in executing the current study.

The researchers conducted the interviews in the form of 'conversations' (Sarbin, 1986) with a mixture of local Malay and English languages using video calls. Thus, assuring that a richer context can be captured and the interviewees will be able to convey their opinions freely about the subject led to meaningful discussions. Before the session, the interview questions were sent to the interviewees for their preparation and to gauge better responses. The input gained from the interviews was then reviewed and analyzed based on the coding method. Finally, the textual data were read, analyzed, distinguished, and labeled into smaller parts using assigned codes. The codes were identified and assigned before the data analysis stage. Ultimately, the criteria derived from secondary data (including the precedent studies) and the data from the semi-structured interviews (from the case studies) were synthesized to derive the qualitative findings presented in the remaining sections.

4.0 PRECEDENT STUDIES

Three precedent studies were done to obtain secondary data, as mentioned in the methodology prior to primary data collection. The chosen precedent studies include a primary school in Denmark, a university hospital in Germany, and a psychiatric centre in Belgium as this paper is for the well-being of youths, and thus the stakeholders of precedent studies are directed students or underage, and the locations chosen are mainly beneficial related to the well-being of the occupants psychologically.

4.1 Haver til Maver (HtM), Copenhagen, Denmark

This study carried out by Malberg & Wistoft (2018) at a primary school described the significant need to have nature to ensure student well-being. Designers must discover the balance between modern interiors and greenery elements while designing a space and find harmonization between indoor landscape, outdoor environments, and complex structures to create a space that could positively impact the occupants' psychology. According to Malberg & Wistoft (2018), exposure to natural elements, such as their school garden programme affects students positively.

The outdoor landscape environment design of the HtM promotes outdoor learning by setting up school gardens to increase the interaction of students with nature. Reportedly, exposure to greenery elements has boosted the students' sense of well-being.



Fig. 2: School Garden programme in HtM
Source: (Field to School - Denmark, 2022)

4.2 Helios University Hospital Wuppertal (HUHW), Germany

Color and lighting design is significant in healthcare architecture (Buether & Wöbker, 2020). It psychologically affects patients' and staff's well-being at the Wuppertal Centre. Through experiments, the highest percentage of satisfaction improvement among patients is the colorfulness

of the room, recorded at 62.7% after renovation. Sense of privacy among patients also increases by 55.2% with the new room design, while daylighting and artificial lighting improvement increase the satisfaction level by 23.1% and 54.3%, respectively. The replacement of neon illuminants with LED illuminants keeps the color temperature of the rooms warm white (3000K), creating a natural ambiance. On the other hand, the color temperature of corridors and functional rooms is kept at cold white with the usage of daylight. This ambiance creates contrast and a feeling of 'shift of atmosphere'. Besides, rotating the direction of the bed also enables the patients to engage in the outdoor view, which calms them down emotionally. Moreover, indirect contact with natural elements such as sky, green scenery, sunlight, and so on brings a positive attitude to patients' state of well-being.

The influence of colour and light factors contributes to the rooms' perception and the occupants' well-being. Reportedly, the 'wellness-atmosphere' room impression of patients and staff rooms contributes to more effective caring service.



Fig. 3: Clinic of Intensive-care medicine patient room, before renovation
Source: (Buether & Wöbker, 2020)



Fig. 4: Clinic of Intensive-care medicine patient room, after the renovation
Source: (Buether & Wöbker, 2020)

4.3 Kinder Psychiatrisch Centrum (KPC), Genk, Belgium

Fricke et al., (2019) suggested that the fundamental factors supporting patients in their recovery journey were to expose themselves more to natural elements such as sunlight and green plants and make a wise choice of color and space design while designing the building. Besides, the effects of architectural and built environmental factors (e.g., colour, daylight, greenery, materials) in influencing the convalescence period is also being emphasized, especially in designing space for sick children. Moreover, noise and sound could affect the recovery process as it is claimed that reduction in noise and increment of natural element accessibility results in stress reduction. Sufficient exposure to daylight decreases depression, and cool colors reduce the chances of triggering aggressive behavior among patients. An atmosphere of privacy also generally supports the recovery of patients (Fricke et al., 2019).



Fig. 5: Kinder Psychiatrisch Centrum (KPC), Genk
Source: (Fricke et al., 2019)

5.0 FINDINGS AND ANALYSIS

Based on sets of primary and secondary data collected, it was found that most of the physical space design that contributes to one's well-being is usually designed carefully with appropriate architectural elements application. The design of juvenile institutions is said to follow the standard set by local authorities, which has taken youths' well-being into account in both physical and psychological aspects. Human psychology and emotion are often influenced by the design of physical space through various elements (Mahmoud, 2017).

Precedent study 4.2, HUHWH implies that colour is the most impactful aspect in a physical space that would help promote human adaptation to the environment; good choices of colour induce a good mood and enhance human well-being. Research shows that the youth's psychological attitude is associated with colors. Through experiments, it has been found that patients' most desired elements are colour and lighting (Buether, 2020). This result is also supported by precedent study 4.3, KPC, which opines that blue and green colors enhance their patient's emotional balance (Fricke et al., 2019). Thus, it is wise to claim that colour as part of the physical space design plays a role in youths' well-being. The interviewees from juvenile institutions also support this statement. C1 explained: *"Yes, actually in terms of color aspect, space design, facilities availability, they did play a role in their state of well-being and body welfare. We are currently planning to set up a new committee organized by the youths to maintain the space's welfare in terms of cheerfulness and cleanliness. For example, if they think that the colour of the building is dull for them and wish to repaint it for their well-being, they could apply to the management executive, and I will raise this issue to the headquarter."*

The correct usage of colour and daylight also contributes to one's well-being. C2 stresses the importance of colour and daylighting in untangling our minds: *"Colour plays an important role in our daily life. Not only to the juveniles in our institution but also even when outside of our institution. When we prepare the room with suitable daylighting and make efficient choices of color, the dormitory will appear wide; a wider view could calm our emotions and minds, providing psychological comfortability, etc."* (Figure 6).

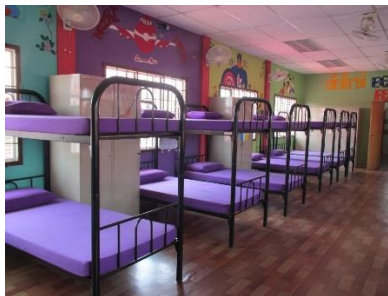


Fig. 6: Dormitory of Sekolah Tunas Bakti

Thus, correct choices of color in our physical environment contribute positive emotional influence on the occupants. Therefore, both C1 and C2 believe that tackling the suitable color tone would help promote youths' well-being. These are also the results analyzed from precedent study 4.2, HUHWH.

A good living space design should provide access to an appropriate amount of daylight and sunlight every day in keeping the positivity of end-users of the building, especially youths and children. As analyzed from precedent study 4.2, HUHWH, and 4.3, KPC, direct contact with sunlight promotes

good general health and positively affects end users' emotions. At the same time, C2, by referring to his institution's daily activities schedule, explained how daylighting and sunlight are provided to juveniles through activities organized and their importance: *"For your information, we have our daily activities schedule, and there goes the movement of our juveniles. At 11 am, all the juveniles will carry out their respective activities such as cleanliness, planting, and workshop. This is when they receive a daily dose of sunlight and move away from their dormitory during the movement from the hostel to their respective locations. They are not staying statically only in their dorms. Besides, we also motivate them to carry out outdoor activities, especially during the evening, such as playing football. Before this, we also organized an outing to Zoo Taiping and National Zoo and visited places surrounding Penang Island. The outing activity is a way to increase their experience and knowledge and expose them to sufficient daylight outside of the institution."*

Fricke et al., (2019) opined that daylighting is crucial, especially when designing a building that caters to children and youths to feel accepted in space. Hence, "access to light" is a fundamental environmental need for the state of well-being of youths. On the other hand, human well-being is linked to the natural environment; a study has shown that floral elements and foliage promote a positive emotional state. According to Adachi et al., (2000) human response to nature is complicated; however, exposure to natural elements balances the harmony between nature and end users' general health and mental well-being. Based on the analysis done on precedent study 4.1, HM, environmental psychology affects humans intensely. Hakuna is designed to be a semi-open restaurant that integrates interior and exterior landscaping green views through a covered outdoor pathway made of stone. Indoor greenery is planted along the indoor wall to create a natural environment and provide tranquility in the space. Installing natural elements into space creates a sense of belongings in the area (Dash, 2017). C3 opines that exposure to nature is a way to maintain youths' well-being: *"Although the policy of our institution is more emphasizing on academic and religion, however, we do encourage them to involve in co-curriculum activities in school. And in our institution, we provide facilities for sports such as netball for girls, football and 'sepak takraw' for boys during rest time. Exposure to sports in the field and so on could stimulate and refresh their mind etc."*

Hence, it could be said that C3 believes that youths immersing themselves in nature by doing outdoor sports brings positive effects on them physically and emotionally. On the other hand, C2 also believes that landscaping in a living space plays its part in providing a suitable living environment for the youths. C2 explained: *"While we were renovating and reconstructing this institution for the well-being of the juveniles, we considered several aspects. This as well, including the landscaping. Landscaping included softscape and hardscape as well as plantings. We installed landscape in every building we build, and we also encourage all our juveniles to do plantings, food plantings such as chili, and so on."* (Figure 7)



Fig. 7: Green Plants Surrounding Buildings in Sekolah Tunas Bakti

C2 also explained how exposure to nature is used as a therapy method to promote mental stability among juveniles: *"We also provide therapy in our institution. This therapy refers to both softscape and hardscape. We build a pond, maintain its water cleanliness level, provide fingerlings to the juveniles and then ask them to take care of the fish. When the juveniles are given freedom and space to focus on carrying out these landscaping activities, they are given a chance to refresh their minds. Our institution encourages them to do plantings because we believe that landscaping activities could provide serenity and tranquility to our juveniles."* (Figure 8).



Fig. 8: Natural Elements in Sekolah Tunas Bakti

Opinion of C2 is also strengthened through the result analysis of precedent study 4.3, KPC. According to it, increment of natural element accessibility reduces stress and pain. Furthermore, easy access to the landscaped outdoor area is essential in the therapeutic process for children (Fricke et al., 2019). Therefore, it is design-wise when a physical space is designed in such a way that it maximizes nature and greenery accessibility.

Furthermore, the open concept and providing open space is one of the design elements that should be considered while designing a physical living space. Mahmoud (2017) believes that outdoors or open spaces like gardens or a pathway that enables people to walk freely is one of the natural environmental elements that help reduce the anger and stresses of the occupants and induce relaxation in them. The degree of freedom in open space defines the level of well-being of end-users in the area. Interviewee C1 stated: *"At this stage, we are maximizing the usage of the spaces that we are having. For example, there is a space behind the dormitory, and we make use of it by letting the juveniles do some planting activities. This is because when we uphold the concept of openness, with all the fencing around the institution, safety is assured, and why not let them move freely and do some outdoor activities in our own space? We do not want them to stay in their room all day because they are not criminals; we should treat them like children who deserve a second chance."* (Figure 9)



Fig. 9: Outdoor Activities in Asrama Akhlak Paya Terubong

As C1 suggested, outdoor exposure benefits the youths in the juvenile institution. Therefore, the impact of outdoor and open spaces plays a role in designing an ideal physical space for youths' well-being. Besides, interviewee C3 also stresses that openness is important for the youths: *"Yes, there is an unoccupied land in our institution, and we are using it as an open space for the children to do sports or play around and so on. Sometimes there are also representatives from USM that would*

visit the children and us around once in three months to give motivational talks and teach them how to do plantings. These are some of the events we have done using the open space, and these are what we encourage."

In short, an open space design that provides physical activity accessibility is one of the architectural elements that should be considered while designing a building or a living space. In addition, open spaces or outdoors generate positive emotional and psychological impacts in maintaining the state of youths' well-being. In addition, ventilation is also one of the architectural elements that should be taken care of in enhancing the physical living space of youths to influence positive well-being. (Najafi et al., 2019) claims that natural ventilation by window opening in the classroom reduces the room's temperature and could reduce the stress and anxiety of female high school students. Birdsong et al., (1990) suggests that ventilation is one of the basic requirements for the healthy growth of children. Interviewees C2 and C3 support these statements. According to C3, he suggests that a comfortable environment could be created for the institutions' juveniles with sufficient ventilation: *"We make sure that they are living in a very comfortable space. Although we do not have air conditioning in the dorms, we provide fans in every dorm to ensure they are living comfortably. The number of windows needed in every room also follows the standard approved by the relevant authorities."*

C2 further emphasizes that airflow is crucial in keeping the living space clean and comfortable for the juveniles: *"Yes, we provide windows in every dormitory, and the ventilation is said to be very suitable and comfortable. There is air flowing in and out consistently all day. And the window we use is strong enough, which is suitable for air flowing and ventilation in the dormitory. So, whoever enters the room will not experience any pungent smell that causes an uncomfortable feeling. Hence, ventilation guarantees the cleanliness of the dorm and is comfortable for juveniles to stay."* (Figure 10).



Fig. 10: Adequate Openings in Dormitory of Sekolah Tunas Bakti

Therefore, an adequate amount of living space ventilation is one of the elements designers should consider ensuring the healthy growth of youth's well-being in Penang. Moreover, privacy is also one of the elements that should be taken care of while designing a youth center. Analysis of precedent study 4.3, KPC, shows that an atmosphere of privacy could support convalescence among patients, especially psychiatric patients. Personal space is one of the required elements for living space design to sustain the state of well-being. Having their own space creates a sense of belongings in the specific area. The statement is supported by one of the interviewees, C2. C2 explained: *"There are 24 juveniles in one dormitory, and every dormitory is completed with their washrooms. We also prepared each juvenile a bed, double-decker, pillow, and blanket. Besides, we also provide each juvenile with cupboards to keep their belongings such as clothes, daily needs, etc."* (Figure 11).



Fig. 11: Individual Cupboards for Each Juvenile

C2 further explained by elaborating the action that has been taken by the management team of his institution to protect the personal privacy of the juveniles: *"For your information, we place an officer in guarding the juveniles in each dormitory, this is the privacy we provided to the juveniles where we do not disturb the juveniles in the dorms, and we are taking good care of them. For example, we never install CCTV in their dormitory; this is the best privacy we protect them without interrupting their daily activities."*

In short, although juveniles may have misdome some crimes and are living in a juvenile center, essential personal privacy must be provided to maintain their state of well-being. When they feel protected, it creates a sense of belonging, and it contributes to the positive growth of psychological health. The literature review (including precedent studies), case analysis, and semi-structured interviews have shown that there are mainly six architectural elements that bring psychological influence on the occupants in a physical living space. Hence, this refers to physical space design and its significance in perpetuating end users' state of well-being of Penang youths. Youths' state of well-being regarding their current living space is essential to untangle their potential physical and mental health issues. However, many other elements may influence children psychologically, such as safety issues, layout arrangement, circulation, noise level, materials, etc. Therefore, the significance of this paper is to inform other researchers to pay more attention to architectural context while trying to identify the causes and effects of the state of well-being among Penang youths.

6.0 CONCLUSION

This paper reviews the aspects of a physical space design that must be included during the design planning stage, including design elements. These physical conditions could help perpetuate youths' healthy state of well-being in Penang, Malaysia. It was found that six main architectural elements could affect youths psychologically; these include color, daylighting, exposure to green and natural elements, ventilation, a sense of privacy, and open spaces. The requirements of designing a space for the state of well-being of end-users are becoming more critical. Therefore, more people and designers emphasize the significant impacts of well-planned living spaces. According to this study, the physical space design of youth institutions must be taken care of from various aspects. For instance, the color of space affects one's mood, exposure to greenery and nature soothes and refreshes mindsets, exposure to natural lighting not only helps in physical health as well mental well-being and open space help in providing adequate freedom to youths in pursuing their interest, but openings also provide visual comfort, etc. These are the elements that should be wisely taken into consideration while designing a living space. Therefore, it suggests that wise usage and implementation of architectural elements in youth institutions benefit in reducing the mental health risk among youths in Penang in the local Malaysia context. However, this study has limitations because it only deals with Penang youth institutions. Therefore, future studies should plan to compare the youth institutions from other parts of Malaysia, and through this, a more advanced study can be expected.

ACKNOWLEDGMENTS

We would like to appreciate the Ministry of Higher Education of Malaysia (MoE) for supporting this research under the Fundamental Research Grant Scheme (FRGS) (Acc. No: 203 /PPBGN /6711882), the Department of Social Welfare of Malaysia, Universiti Sains Malaysia (USM), as well as other parties that have directly and indirectly contributed.

REFERENCES

- Abbott-Chapman, J., & Robertson, M. (2015). Youth Leisure, Places, Spaces and Identity. In S. Gammom, & S. Elkington, *Landscapes of Leisure* (pp. 1-18). London: Palgrave Macmillan London. doi:http://dx.doi.org/10.1057/9781137428530_9
- Abdullah, D. N. (2017). *Malaysian Mental Healthcare Performance*. Putrajaya: Malaysian Healthcare Performance Unit, National Institute of Health.
- Adachi, M., Rohde, C., & Kendle, A. (2000). Effects of Floral and Foliage Displays on Human Emotions. *International Human Issues in Horticulture*, 10(1), 59-63.
- Ahmad Anas, A., & Jamilah Hanum, A. (2020). An Exploratory Study on the Perceived Challenges, Coping Strategies and Facilitating Factors for Optimal Implementation of Community-based Mental Health Services in Malaysia: A Study Protocol.
- Avella, F., Akshit, G., Belleri, A., Babich, F., Peretti, C., Fulici, G. & Verdi, L. (2021). Indoor Air Quality monitoring in a historic school in South Tyrol, Italy. *IOP Conference Series: Earth and Environmental Science*. 863, pp. 1-8. IOP Publishing Ltd. Retrieved from <https://iopscience.iop.org/article/10.1088/1755-1315/863/1/012056>
- Baghchesaraei, O., & Baghchesaraei, A. (2015). Space Definition in Modern and Innovative Houses. *Indian Journal of Fundamental and Applied Life Sciences*, 5, 266-269.
- Bak Yao, L. (2020, December 31). Psychological And Physiological Benefits Of Plants In The Indoor Environment A Mini And In-Depth Review. *International Journal of Built Environment and Sustainability*, 57-67. doi:10.11113/ijbes.v8.n1.597
- Baloch, R., Maesano, C., Christoffersen, J., Mandin, C., Csobod, E., de Oliveira Fernandes, E., & Annesi-Maesano, I. (2020). Daylight and School Performance in European Schoolchildren. *International Journal of Environmental Research and Public Health*, 18(258), 1-13. doi:<https://doi.org/10.3390/ijerph18010258>
- Birdsong, C., Wyant, M., & Sherman, D. (1990). *Designing interior space for children*. Cooperative Extension work.
- Bitner, M. (1990). Evaluating service encounters: The effects of physical surroundings and employee responses. *Journal of Marketing*, 54(2), 69-82. doi:<https://psycnet.apa.org/doi/10.2307/1251871>
- Buether, A., & Wöbker, G. (2020). *Assessment of the psychological and medical effects of the environmental factors colour and light on patients and staff in the department of intensive-care medicine*. Study Helios University Hospital.
- Corbusier, L. (1965). Towards a New Architecture. In L. Corbusier, *Towards a New Architecture* (p. 318). New York: Dover Publications, INC.,.
- Ćurčić, A., Keković, A., Randelović, D., & Momčilović-Petronijević, A. (2019). Effects of color in interior design. *Contemporary achievements in civil engineering*, 867-877.
- Dash, S. P. (2017). Interior Landscape: Behavioral and Emotional Impact on Human Psychology. *Journal of Civil Engineering and Environmental Technology*, 4(3), 205-210.
- Department, P. M. (2017). *Malaysia Sustainable Development Goals Voluntary National Review*. Putrajaya: Economic Planning Unit.
- Evans, G. W. (1973). Personal Space: Interior design approaches to bedrooms in mental health

- developments. *Psychological Bulletin*, 80(4), 334-344.
- Field to School - Denmark. (2022). Retrieved from Field to School: <https://www.fieldtoschool.eu/denmark-1>
- Fricke, O. P., Halswick, D., Längler, A., & Martin, D. (2019). Healing Architecture for Sick Kids. *Zeitschrift für Kinder- und Jugendpsychiatrie und Psychotherapie* (2019),, 47(1), 27-33.
- Ganapathy, D. S. (2019). *National Health and Morbidity Survey 2019: Non-Communicable Diseases, Healthcare Demand and Health Literacy*. Selangor: Institute for Public Health, Ministry of Health, Malaysia.
- Heschong, L., Wright, R., & Okura, S. (2002). Daylighting Impacts on Retail Sales Performance. *Journal of the Illuminating Engineering Society* ISSN:, 31(2), 21-25. doi:<https://www.tandfonline.com/action/showCitFormats?doi=10.1080/00994480.2002.10748389>
- Institute for Public Health. (2018). *National Health and Morbidity Survey 2017: Adolescent Health and Nutrition Survey*. Kuala Lumpur: National Institutes of Health, Ministry of Health Malaysia.
- Jacobsen, J. (n.d.). *The Needs of Living*. Norwegian University of Science and Technology.
- Liu, Q., Wang, X., Liu, J., An, C., Liu, Y., Fan, X., & Hu, Y. (2021, October 12). Physiological and Psychological Effects of Nature Experiences in Different Forests on Young People. *Forest Ecology and Management*, 12(10), 1-17. doi:<https://doi.org/10.3390/f12101391>
- Mahmoud, H. (2017). Interior Architectural Elements that Affect Human Psychology and Behavior. *The Academic Research Community Publication*, 1(1), 1-10.
- Malberg, D. P., & Wistoft, K. (2018, February 8). Wellbeing in school gardens – the case of the Gardens for Bellies food and environmental education program. *Environmental Education Research*, 24(8), 1177-1191. doi:<https://doi.org/10.1080/13504622.2018.1434869>
- Mental Health Foundation. (2021). *Mental Health Foundation*. Retrieved from Stress: <https://www.mentalhealth.org.uk/a-to-z/s/stress>
- Mohammad, S. (2013). *Colourful Language: Measuring Word-Colour Associations*. Ontario, Canada: National Research Council Canada.
- n.d. (2022, March 16). *Child Abuse and Neglect: What Parents Should Know*. Retrieved from healthychildren: <https://www.healthychildren.org/English/safety-prevention/at-home/Pages/What-to-Know-about-Child-Abuse.aspx>
- Najafi, N., Movahed, K., Barzegar, Z., & Samani, S. (2019). The Effect of Ventilation by Window Opening on Stress, Anxiety, and Depression of Female High School Students. *International Journal of School Health*, 6(2), 1-5.
- Namazian, A., & Mehdipour, A. (2013). Psychological Demands of the Built Environment, Privacy, Personal Space and Territory in Architecture. *International Journal of Psychology and Behavioral Sciences*, 3(4), 109-113.
- Persiani, S. (2021, October 29). Benefits of Using Plants in Indoor Environments: Exploring Common Research Gaps. *Architecture*, 83-98. doi:<https://doi.org/10.3390/architecture1020008>
- Sarbin, T. (1986). *Narrative Psychology: The Storied Nature of Human Conduct*. London: Praeger Press, 2(2).
- Shishegar, N., & Boubekri, M. (2016). Natural Light and Productivity: Analyzing the Impacts of Daylighting on Students' and Workers' Health and Alertness. *Health, Biological and Life Science*, (pp. 151-156). Istanbul, Turkey.
- Staff, M. C. (2022, March 2). *Mental illness in children: Know the signs*. Retrieved from Mayo Clinic: <https://www.mayoclinic.org/healthy-lifestyle/childrens-health/in-depth/mental->

illness-in-children/art-20046577

- Taylor, C. (2016, July 2). *Psychology Tomorrow Magazine*. Retrieved from Aesthetics and Well-Being: How Interior Design Affects Your Happiness: <https://psychologytomorrowmagazine.com/aesthetics-and-well-being-how-interior-design-affects-your-happiness/>
- Wang, J. (2016). The Application of Plant Landscape in Interior Design. In *2016 2nd International Conference on Education Technology, Management and Humanities Science* (pp. 1-8). Atlantis Press.
- World Health Organization. (2019). *Suicide in the World: Global Health Estimates*. World Health Organization. Retrieved from <https://apps.who.int/iris/handle/10665/326948>. License: CC BY-NC-SA 3.0 IGO
- Yeoh, S., Tam, C., Wong, C., & Bonn, G. (2017, August 22). Examining Depressive Symptoms and Their Predictors in Malaysia: Stress, Locus of Control, and Occupation. *Frontiers in Psychology*, 8, 1-10. doi:10.3389/fpsyg.2017.01411