Physical space and end-user’s well-being: Perceptions of custodians from Youth Institutio in Penang

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ABSTRACT

This paper identifies the physical space design that could influence the Penang youths’ state of well-being positively. The objectives of this study to comprehend the relationship between the psychological influence of physical space and the state of well-being of youths in the youth institution to determine the relationship between physical space and its significance in perpetuating end users’ state of well-being of Penang youths and enlighten on the understanding of physical space design that is influential to the state of well-being of Malaysian youths. This analysis will look onto aspects of physical space, including design elements, physical condition, and space sufficiency in youth’s current living space such as choices of colours, presence of daylighting, utilization of indoor landscape, open spaces concept, ventilation, and sense of privacy. The finding of this study generally helps to enlighten the understanding of physical space design that are influential to the state of well-being of youths in Penang.

Keywords: Living space, Mental health, Penang, Physical space, Youths

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Introduction

Mental health issues have shown a rapid climb in Malaysia. Mental illness is the second crucial health issue affecting Malaysians after heart disease according to the National Health and Morbidity Survey (NHMS) in 2018. The mental health issue is being included in one of our Sustainable Development Goals (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).

Hassan et al. (2018) claimed that mental health disorders became a great public health concern globally. According to the World Health Organization (WHO), one of the most common mental health disorders is depression, with the estimation of more than 350 million people affected globally (Marcus et al. 2017). According to the Mental Health Foundation, 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 (Mental Health Foundation 2021a).

Malaysia government has constantly been executing and evaluating the local policies of our mental health issues aiming to restrain potential mental health illnesses (Almi and Khaiyom 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 have shown that a good home and interior design has been associated with the improvement of mental health and human emotions- through factors such as color and natural elements (Taylor 2016).

According to Ricci (2017), many scholars suggested that a beautifully designed architecture
bring positive psychological and physiological impact to the occupants while a poorly designed building would promote negative psychological issues in occupants. Thus, it is wiser to revise the architectural elements in an architectural design that could potentially cause an impact on the mental health well-being of the end-users. Amirhosein (2019), a notable leading researcher from Auckland University of Technology (AUT), believes that in professional architectural design, one must always evaluate multiple variables and parameters in our proposed design that could affect the health of the end users especially emphasizing more on the most neglected mental health issues in order to create a more pleasurable living space to users (AGM A Division of BCI Central 2019). Thus, it appears obvious to suggest now that the architectural design of our living space does influence the mental well-being of the occupants.

Yeoh et al. (2017), through the research, did identifies 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, and these might be the potential factor contributing to the results. Juveniles and orphanages are the groups where people most neglected in our society. They do not know how to express themselves and might have been diagnosed with mental issues without knowing, which might lead to a severe condition such as suicide. According to WHO, the suicide death rate of Malaysia in 2016 was 6.2 per 100,000 population. Therefore, the central focus of this paper is to understand the influence of architectural elements on the mental well-being of youths in Penang, Malaysia.

Research questions: (1) What aspects of physical space are influential to end-user’s well-being? (2) How top management perceived the youth institution under their custody in relation to existing physical space and youths’ well-being? (3) How can the existing physical space of youth institutions be improved for the sake of youths’ well-being?

Research objectives: (1) To comprehend the relationship between the psychological influence of physical space and the state of well-being of youths in the youth institution; (2) To determine the relationship between physical space and its significance in perpetuating end users’ state of well-being of Penang youths; (3) To enlighten on the understanding of physical space design that is influential to the state of well-being of Malaysian youths.

Literature review
Mental health issue in Malaysia
In 2015, the National Health Morbidity Survey (NHMS) reported that the prevalence of mental health disorders among Malaysian adults and children were 29.2% and 12.1%, respectively (Malaysian Healthcare Performance Unit National Institute of Health 2017). In 2017, NHMS reported that the prevalence percentages of adolescents suffering from depression are 18.3%, while 39.7% suffers from anxiety and 9.6% of youths are stressed in Malaysia (Institute for Public Health National Institutes of Health Ministry of Health Malaysia and Lumpur 2017).

A recent NHMS report in 2019 reported that 7.9% of youths aged between 5 to 15 years old were having mental health problems, showing an increasing pattern of such cases. This report was being established to revitalize Malaysia’s healthcare system, emphasizing Non-Communicable Diseases (NCDs) to meet healthcare needs’ demands and benefits resources and costs (National Institutes of Health (NIH) and Ministry of Health Malaysia 2020). In short, depression, anxiety and stress are the three major mental health disorders that Malaysians suffered the most.

Living space design
Space plays a significant role in architecture. Le Corbusier (1923) defined that, “A house is a machine for living in” (Le Corbusier 1985). Le Corbusier’s: Five Points of Architecture Theory” stressed a free layout plan facing North-West is mandatory for living rooms. Sufficient daylight in living spaces, especially in the bedroom is crucial (Baghchesaraei and Baghchesaraei 2015). Usage of colour psychology in interior space is important in creating a suitable ambience of different living spaces in an architecture (HK Interiors, n.d.). Wang (2016) opined that the application of indoor landscape provides a good living environment and promotes a better life quality. Jacobsen believes that occupants feel comfortable within a personal space with their own privacy as it provides sense of belonging.

Physical environment
The physical interior environment is one of the issues that have been continuously discussed in order to create a better and comfortable design for
youths’ well-being. Fricke et al. (2019) point 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 elements such as colour, lighting etc. These two aspects, with ambient factors, create the interior environment (Bittner 1990). Thus, in designing a better physical living space for the state of 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, and outdoor and open spaces, ventilation, and privacy.

i. Colour
Čurčić et al. (2019) has highlighted the significant quality of colours in an interior design of a space that could boost the efficiency of employees, the productivity of student works, convalescence period of patients. Colours leave an important first impression and marked the last remarkable item that we remember. Colours associated with emotions and expressions (Mohammad 2011).

ii. Daylighting
Heschong, Wright, and Okura (2002) concluded from the study that the presence of daylighting in retail stores increases their sales. The induced daylighting has brought association to the employees as well as the consumers in the retail store. Hence, we could say that daylighting improves human performance. Shishegar and Boubekri (2016) described that sunlight is the most influential light source to a human being because it carries a wide spectrum of visible light. An adequate amount of morning sunlight increases alertness and performance quality for occupants in a space.

iii. Accessibility to natural elements
Various scholars have suggested that placing plants around people bring multiple benefits. 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 (Texas A&M Agrilife Extension, n.d.). Flora and foliage positively affect human emotions and promote good psychological reactions when we are close to nature (Adachi, Rohde, and Kendle 2000).

iv. Ventilation
Studies by Craig Birdsong (1990) believed that apart from lighting, fresh air and ventilation are the basic requirements for the healthy growth of children (Saraogi, n.d.). 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 the indoor air quality by air reducing pollutants (Mahmoud 2017). A study by Najafi et al. (2019) suggests that ventilation by window opening in the classroom could reduce the stress and anxiety of female high school students. Ventilation associated with achieving optimum thermal comfort, which also contributes to occupant’s comfort.

v. 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 help in improving the ability of 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) to nature benefits the occupants of living space. In a broader term covering a residential area while in a more specific term, open spaces and outdoors are the open spaces in a private space like houses, homes, and dorms. The degree of freedom to move freely from indoors outdoors influences the degree of 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.

vi. Privacy
According to Architecture+Design Scotland, personal space such as a bedroom is the most private space to its occupant. A good bedroom design that provides sufficient privacy to the younger generation significantly positively affects their mental well-being (Evans 1973). The extent of activities that the occupant could carry out in a space influences their psychological conditions (Namazian and Mehdipour 2013). This could be said that the degree of freedom of one being able to do what they wish in space contributes to the sense of privacy provides positive emotional support.
Space sufficiency

According to Robert-Hughes (2011), space is an important factor when people is choosing a home. Lacking space has been shown to impact the basic lifestyle of occupants. Having sufficient space has also shown to have a significant impact on overall health. The amount of space needed to depend on the lifestyle, the number of people living etc. Overcrowding and inadequate space promote a critical impact on one’s health and well-being. Space insufficiency results in a lack of privacy which may later induce negative emotions among youths such as anxiety and depression. A study done by Omar et al. (2016) suggests that youth and space are commonly related to each other. The availability of facilities and space in their living area contributes to youth’s general health. Recreational areas and outdoor activities help in increasing human activeness. Therefore, adequate housing and living space are crucial in sustaining youth’s state of well-being.

These elements are the most mentioned elements 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.

| Table 1. Evaluation framework |
|---|---|---|---|
| Keywords | Criteria | Description | Source |
| Issues | Mental health | Malaysia mental health performance | (Malaysian Healthcare Performance Unit National Institute of Health 2017; Institute for Public Health National Institutes of Health Ministry of Health Malaysia and Lumpur 2017; Psychiatrist Group and Ministry of Health 2017; National Institutes of Health (NIH) and Ministry of Health Malaysia 2020) |
| Depression | Description of depression | | (Marcus et al. 2017; Torres 2020; Chong Guan 2014) |
| Anxiety | Description of anxiety | | (Muskin 2021; Johnson and Holland 2020) |
| Stress | Description of stress | | (Mental Health Foundation 2021b; Shaiful et al. 2018; TheStar 2018) |
| Colour | How colour affects one psychologically and its significance | | (Curic et al. 2019; Mohammad 2011) |
| Daylighting | How sunlight affects one psychologically and its efficiency in promoting a positive behavioral attitude | | (Heschong, Wright, and Okura 2002; Shishegar and Boubekri 2016) |
| Ventilation | How ventilation rate affects one psychologically and its impact on visual pleasing | | (Craig Birdsong 1990; Mahmoud 2017; Najafi et al. 2019) |
| 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 and Mehdi pour 2013) |
| Space sufficiency | How space affects youths’ emotions. | | (Robert-Hughes 2011, Omar et al. 2016) |

Method

Both primary and secondary data were obtained and analysed to achieve the three research objectives of this study. At the first stage, the researcher develops an evaluation framework based on previous journals, reports, and official websites relevant to this research topic through literature reviewing. The keywords and criteria stated in the framework are being identified as the most influential elements of living space to youths. Next, case studies research was done to identify the criteria mentioned in the framework. The ‘coding’ technique was used. On the other
hand, to obtain primary data, a questionnaire is prepared based on the criteria mentioned in the framework to conduct semi-structured interviews with youth institutions’ custodians. Interviews were done online through video call interviews and were being conducted in ‘conversations’ to assure that the custodians are conveying their opinions freely. The answers gained from the interviews were then being reviewed and analysed, the keywords are being identified based on the framework prepared. At the final stage, the criteria identified from both case studies and semi-structured interviews, which are linkage with the evaluation framework, were used to derive the significant relationship between physical space and youths’ state of well-being.

![Diagram of data collection process](image1)

**Figure 1.** Data collection

**Case studies**

1. **Hakuna Matata, Manipal**

   The case study research carried out by Dash (2017) described the significant need of linking nature and interior space. Designers must discover the balance between modern interiors and the greenery elements while designing a space and find harmonization between indoor landscape and hard structure to create a space that could positively impact the occupants’ psychology. There are two main types of interior landscape which are softscape and hardscape. Softscape requires regular maintenance and care, such as green plants, while the hardscape, such as stone and wood elements that used to create obvious contrast to the softscape. According to the case study, this natural sense could help develop a positive ambience to help occupants in their declining health problems.

   The interior landscape design of the Hakuna restaurant links with the outdoor environment through a covered outdoor pathway made of stone indicates the concept of openness of the restaurant (figure 2). Indoor greenery is planted along the periphery of the walls to create a natural environment and provide tranquility in the space (figure 3). The choices colour of the restaurant is mainly earthy tones from yellow to brown with slight hints of red, which can create a sense of naturally warm ambience (figure 4). A translucent shelter is also spotted being used at the dining area to allow maximum daylighting during daytime (figure 4).

![Image of Hakuna Matata restaurant](image2)

**Figure 2.** Semi-open space with laterite pathway and grass tiles

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**Figure 1.** Data collection

**Figure 2.** Semi-open space with laterite pathway and grass tiles
2. Helios University Hospital Wuppertal, Germany

Colour and lighting design are playing significant role in designing for healthcare architecture (Buether and Wöbker 2019). It affects both patients and staff’s well-being at the Wuppertal centre psychologically. Through experiments done, the highest percentage of satisfaction improvement among patients is the colourfulness 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 increases the satisfaction level by 23.1% and 54.3% respectively. The replacement of neon illuminants to LED illuminants keeps the colour temperature of the rooms warm white (3000K), creating a natural ambience. On the other hand, colour temperature of corridors and functional rooms are kept at cold white with the usage of daylight. This is to create contrast and feeling of ‘shift of atmosphere’. Besides, rotating the direction of bed also enable the patients to engage to the view to outdoor which calms them down emotionally. Indirect contact with natural elements such as sky, green scenery sunlight and so on brings positive attitude to patients’ state of well-being.

The influence of colour and light factors does not only contribute to the perception of the rooms but also to the well-being of the occupants. Based on the case study, the ‘wellness-atmosphere’ room impression of patients and staff rooms contributes to a more effective caring service.

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 colour 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 designing space for sick children. Moreover, noise and sound are also one of the factors that could affect the recovery process as it is claimed that reduction in noises and increment of natural element accessibility results in a reduction of stress, sufficient exposure to daylight decreases depression and cool colours reduce the chances of triggering aggressive behaviour among patients. An atmosphere of privacy also generally supports the convalescence of patients.

![Image](image1.jpg)

**Figure 7.** Kinder Psychiatrisch Centrum (KPC), Genk

<table>
<thead>
<tr>
<th>Case study</th>
<th>Architectural elements</th>
<th>Landscaping (nature)</th>
<th>Colour</th>
<th>Sunlight</th>
<th>Ventilation</th>
<th>Privacy</th>
<th>Outdoor and open spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hakuna Matata, Manipal</td>
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<tr>
<td>3. Child and Adolescent Psychiatry Genk, Belgium</td>
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**Table 2.** Architectural elements influential to the occupants

**Result and discussion**

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

Design and physical conditions

Case study 2 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 by colours. Through experiments done, it has been found out that the most desired elements by patients are colour and lighting (Buether and Wöbker 2019). This result is also supported by Case study 3, which opines that blue and green colour 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 institution also support this statement. C1 explained, “Yes, actually in terms of colour aspect, space design, facilities availability, they did play a role in their state of well-being as well as their body welfare. We are currently planning in setting up a new committee that organised by the youths themselves in maintaining the space welfare in terms of cheerfulness and cleanliness aspects. For example, if they think that the colour of the building is dull for them and wish to repaint it for the sake of their well-being, they could make an application 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 daylight 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 especially making efficient choices of colour, the dormitory will appear to be wide; a wider view could calm our emotions and minds down, providing comfortability psychologically etc.” (See figure 8)

Figure 8. Dormitory of Sekolah Tunas Bakti

Thus, correct choices of colour in our physical environment contributes positive emotional influence on the occupants. Both C1 and C2 believe that tackling the suitable colour tone would help promote youths’ well-being. This is also the results analysed from Case study 2.

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 analysed from Case study 2 and 3, direct contact with sunlight promotes good general health and leads to a positive psychological effect on 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 organised 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 and so on. Before this, we also organised an outing to Zoo Taiping, National Zoo and visiting places surrounding Penang Island. This is a way to increase their experience and knowledge as well as exposing them to sufficient daylight outside of the institution.”

Fricke et al. (2019) opines that daylighting is crucial, especially when designing a building that caters to children and youths to feel accepted to 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 and foliage promotes a positive emotional state. According to Adachi, Rohde, and Kendle (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 Case study 1, environmental psychology affects humans intensely. Hakuna is designed to be a semi-open restaurant that integrates both 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 space (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 into them physically and emotionally.

On the other hand, C2 also believes that landscaping in a living space plays its part in providing a good living environment to the youths. C2 explained, “While we were renovating and reconstructing this institution for the well-being of the juveniles, we consider 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.” (See figure 9)

Figure 9. Green plants surrounding buildings in Sekolah Tunas Bakti

C2 also explained how exposure to nature is used as a therapy method in their institution 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, and we provide fingerlings to the juveniles and ask them to take care of the fishes. When the juveniles are given freedom and space to focus on carrying out these landscaping
activities, they are given chance to refresh their minds. In our institution, we also encourage them to do plantings because we believe that landscaping activities could provide serenity and tranquility to our juveniles.” (See figure 10)

![Figure 10. Natural elements in Sekolah Tunas Bakti](image-url)

Opinion of C2 is also strengthened through the result analysis of Case study 3. According to the analysis of Case study 3, increment of natural element accessibility results in reduced stress and pain. Easy access to the landscaped outdoor area is important 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 is maximising nature and greenery accessibility.

Furthermore, the concept of openness and providing open space is one of the design elements that should be taken into considerations 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 into them. The degree of freedom in open space defines the level of well-being of end-users in the space. Interviewee C1 stated: “At this stage, we are maximizing the usage of the spaces that we are having. For example, there is an empty space behind the dormitory, and we make use it by letting the juveniles do some planting activities. This is because when we are upholding 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 our own children that deserve a second chance.” (See figure 11)

![Figure 11. Outdoor activities in Asrama Akhlak Paya Terubong](image-url)

As C1 suggested, exposure to the outdoors benefits the youths in the juvenile institution. Therefore, the impact of outdoor and open spaces plays a role in designing a good physical space for youths’ well-being. Besides, interviewee C3 also stresses that the concept of 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 as well teaching 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 activities accessibility is one of the architectural elements that should be taken into count while designing a building or a living space. 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 temperature of the space and could reduce stress and anxiety of female high school students. Craig Birdsong (1990) suggests that ventilation is one of the basic requirements for the healthy growth of children. These statements are supported by the interviewees C2 and C3. According to C3, he suggests that a comfortable environment could be created for the juveniles in the institution 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 do provide fans in every dorm to make sure they are living comfortably. The number of windows needed in every room is also following 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 do 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 comfortable for juveniles to stay.” (See figure 12)

Figure 12. Adequate openings in dormitory of Sekolah Tunas Bakti

Therefore, an adequate amount of living space ventilation is one of the elements designers should consider to ensure 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’s centre. Analysis of Case study 3 shown that an atmosphere of privacy could support the convalescence among patients, especially psychiatric patients. Personal space is one of the required elements for living space design for sustaining the state of well-being. Having their own space create a sense of belongings in the specific space. 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, blanket. Besides, we also provide each juvenile with their cupboards for them to keep their belongings such as clothes, daily needs and so on.” (See figure 13)
C2 further explained by elaborating the action that has been taken by the management team of his institution in protecting 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 are protecting them without interrupting their daily activities.”

In short, although juveniles may have misdone some crimes and are living in a juvenile centre, the essential personal privacy must be provided in order to maintain the state of well-being. When they feel protected, it creates a sense of belonging, and it contributes to the positive growth of psychological health.

Space sufficiency

Based on the semi-structured interviews done, it has been found out that from all custodians’ points of view, both the juvenile centres (Asrama Akhlak Paya Terubong and Sekolah Tunas Bakti Teluk Air Tawar) and orphanage shelters (Wisma Yatim Laki-laki Islam and Wisma Yatim Perempuan Islam) are satisfied with the space allocation of their institutions. The main reason is that the number of intakes to the institution’s capacity is only at the range of 20-50% for each institution. Therefore, there are extra spaces for the juvenile to carry out activities. For example, making use of the unoccupied land to do sports and plantings and so on to soothe their emotions and well-being. Besides, from the interviews, we have found out that all the juveniles from the institutions are satisfied with the design, physical condition, and space allocation of their living space as there have been no complaints regarding the design of their living space custodians. Hence, space sufficiency is an important issue that should be taken into account while designing for juvenile, and fortunately, space allocation is sufficient for all institutions we have investigated for this study.
Table 3. Percentage of intakes

<table>
<thead>
<tr>
<th>No</th>
<th>Institution</th>
<th>Capacity (Nos)</th>
<th>Current intakes (Nos)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Asrama Akhlak Paya Terubong</td>
<td>50</td>
<td>24</td>
<td>48</td>
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<tr>
<td>2</td>
<td>Sekolah Tunas Bakti Teluk Air Tawar</td>
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<td>61</td>
<td>40.67</td>
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<tr>
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<td>Wisma Yatim Perempuan Islam</td>
<td>250</td>
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The literature review, 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 important to untangle their potential physical and mental health issues. However, many other elements may influence youths psychologically, such as safety issues, layout arrangement, circulation, noise level, materials, etc. Therefore, the significance of this paper is to inform other researchers in paying more attention to architectural context while trying to identify the causes and effects of the state of well-being among Penang youths.

Conclusion

Conclusively, this paper reviews the aspects of a physical space design, including design elements, physical conditions, and space sufficiency that 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 colour, daylighting, exposure to green and natural elements, ventilation, sense of privacy and open spaces. The requirements of designing a space for the state of well-being of end-users are becoming more important. More people and designers are starting to emphasise the significant impacts brought by 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 colour of space affects one’s mood, exposure to greenery and natures soothes and refresh mindsets, exposure to natural lighting not only helps in physical health as well mental well-being and open space helps 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 considerations 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.

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Author(s) contribution
Wong Lai Kee contribute to the research concepts preparation and literature reviews, data analysis, of article drafts preparation and validation.
Muhammad Firzan bin Abdul Aziz contributed to the research concepts preparation, methodologies, investigations, data analysis, visualization, articles drafting and revisions.