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Perceptions of Youngsters on Interior Space Quality in Relation to Materiality and Spatial Design

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ABSTRACT

Studies discovered that humans spent around 80% of our time indoor and this phenomenon is deteriorating our health physically and psychologically. Thus, it is important to study the effects of different interior designs on our emotions. The previous studies and researches done on interior spaces are mostly focusing on measurable physical attributes of interior whereas the psychological relationships between interior design criteria and human emotions have not been well studied. Therefore, this research paper aims to determine the suitable interior space for youngsters from different backgrounds in terms of spatial quality and materiality. In this paper, 4 types of commonly-used materials in Malaysia, namely Timber, Concrete, Bricks and Stones are selected to be studied and analyzed based on the respondents' preferences and perceptions of warmness or coolness of materials. The results showed that there is no distinctive relationship between respondents' preferences to materials and their educational backgrounds but respondents of different races showed different degree of acceptance towards different finishing materials. The paper proof the respondents prefer to have warm-feeling materials such as timber and bricks for their home design as compared to cold-feeling materials such as concrete and stones. The results will serve as a material-selection guideline for designers.

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1.0 Introduction

From the historical walkthrough of architecture, humans are psychologically associated with architecture in terms of choice of construction materials (Margarete, 2018). Started from prehistoric period where architecture made from natural resources is mainly for survival and reproductive purposes to Neolithic period with vast stone architecture to emphasis spiritual beliefs & power assertion and then modern period where steel and concrete architecture emphasized the mass production in response to industrialization. Now, architecture has become more diversified and a whole range of construction materials is available and considering the fact that we spend tremendous amount of time indoor where around 90% of people spent 22 hours indoor per day (Walden, 2018), and we experience different state of mind in different architecture (Ricci, The Psychological Impact of Architectural Design, 2017), it is very crucial to have researches and studies done on studying how the users perceive an interior space. However, among the studies and researches done on interior spaces, most of them are focusing on measurable physical attributes of interior spaces such as the Indoor Air Quality (IAQ) and lighting designs whereas the psychological relationships between interior design criteria (Interior finishing materials selection, Fenestrations, Spatial Volume Design, etc.) and human emotions have not been well studied. Thus, this research paper aims to determine the suitable interior space for youngsters from

different backgrounds in terms of spatial quality and materiality and 4 primary finishing materials, namely: timber, concrete, brick and stone are selected for analysis.

1.1 Architecture and Materials

In this technological advanced era, architecture has become more diversified and a whole range of construction materials is available to be used for architectural design. Previous research has found that humans are remarkably good at visually perceiving materials (W.Fleming, 2013) which implies that a well-planned and designed indoor space with the right choice of materials is extremely important for us to live a better life (Gander, 2016). Therefore, sufficient researches and studies regarding the materials should be done as reference data for the users or designers when they are choosing materials. For instances, popular materials such as timber, concrete, bricks and stones shall be studied in terms of both physical and psychological attributes.

1.2 Texture of Materials

The word "Texture" is defined as the "quality of something that can be decided by touch; the degree to which something is rough or smooth, or soft or hard" (Cambridge Advanced Learner's Dictionary 4th Edition, 2013). Although only the sense of touch is mentioned in the dictionary, but when texture is perceived aesthetically, it actually involves another sense known as visual sense. Therefore, the texture of a material can be classified into the two following categories, namely tactile texture and visual texture. Tactile texture refers to the 3D properties of a material which allow it to be valued through tangible or touchable measures (DEZIEL, 2013). For example, the texture of a timber panel is characterized by the wood-grain patterns which synthesize feeling of carved-ins and grooves when we touch the surface. Visual texture values a material from the aesthetical perspective and the texture can be either 3D with uneven surfaces or 2D with paints or wallpapers.

1.3 Colour of Materials

Colour is the general term used to describe every hue, tint, tone or shade our eyes see and the colour black, white and grey are known as colours as well (Figure 1). In colour theory, hue refers to the dominant colour family of the specific colour we're looking at and the colour black, white and grey are never referred to as a hue. Tint is the product of adding the colour white into any hue and it is sometimes known as pastel colour. In another word, it is a paler version of hue. Tone is the product made of adding shades of grey into hue. Toned colours are generally considered more pleasing to the eye. They are complex, subtle and sophisticated. That's because bright pure colours are most often associated with children (Williams, 2011). Shade is a darker version of hue when the colour black is added into hue.

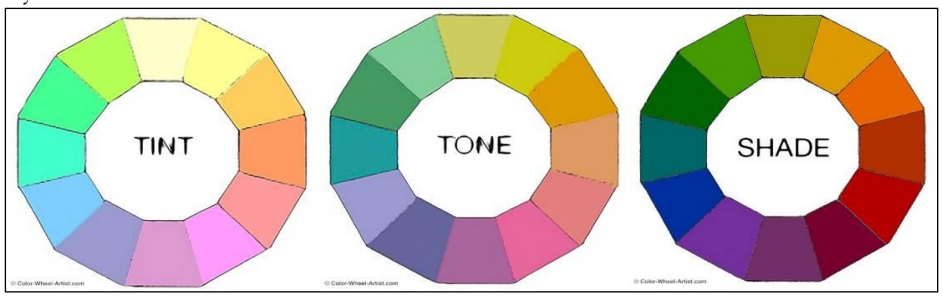


Figure 1 *Colour Tint Wheel, Colour Tone Wheel & Colour Shade Wheel retrieved from the website: https://color-wheel-artist.com/hue/*

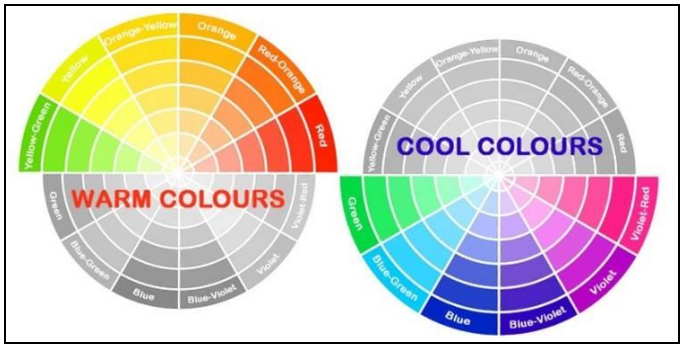


Figure 2 *Warm & Cool Colour Wheel retrieved from the website: https://color-wheel-artist.com/hue/*

Besides of the mentioned properties of colours, colours are being categorized as warm colour or cool colour according to their degree of warmness (Figure 2). Among the 4 selected finishing materials in this paper, timber and brick is perceived as warm while concrete and stone being perceived as cold.

1.4 Color & Emotions

Previous scientific studies and observations have proven that human-environment-reaction in the architectural environment is to a large percentage based on the sensory perception of colour.

For instance, there was a study suggests that "colour can have customer drawing power as well as image-creating potential in retail store design" (Shi, 2013). Although we only perceive colour visually, but actually colours are electromagnetic energy where each of the colours has its own specific wavelength and frequency. This is further proven by a test which showed that a blindfolded person in a room experiences faster pulse rate when he is inside a red room and experiences slower pulse rate when exposed to blue or green (LTD, 2017). The psychological effects of colours are elaborated further in Table 1 below.

Table 1 The Psychological Implications of Colors, retrieved from the website: https://medium.com/studiotmd/the-perception-of-color-in-architecture-cf360676776c

Color	Psychological Effects
Red	**Effect:** exciting, stimulating **Association:** Positive: passionate, fervid, active, strong, warm Negative: intense, aggressive, raging, fierce, bloody
Orange	**Effect:** exciting, stimulating, cheering **Association:** Positive: jovial, lively, energetic, extroverted Negative: intrusive, blustering
Yellow	**Effect:** cheering **Association:** Positive: sunny, cheerful, radiant, vital Negative: egocentric, glaring
Green	**Effect:** retiring, relaxing **Association:** Positive: tranquil, refreshing, quiet, natural Negative: common, tiresome, guilty
Blue	**Effect:** retiring, relaxing **Association:** Positive: calm, sober, secure, comfortable, noble Negative: frightening, depressing, melancholy, cold
Purple	**Effect:** subduing **Association:** Positive: dignified, exclusive Negative: lonely, mournful, pompous, conceited
Brown	**Effect:** subduing **Association:** Positive: warm, secure, stable Negative: oppressive, heavy
White	**Effect:** dis-concerning **Association:** Positive: clean, crisp, bright Negative: empty, sterile
Grey	**Effect:** neutral to calming **Association:** Positive: neutral Negative: boring
Black	**Effect:** ominous **Association:** Positive: deep, abstract Negative: dungeon-like, night, grief, death

1.5 Volume and Scale of Interior Spaces

Other than the choices of materials, spatial design is also another aspect to be studied for a better understanding of how people perceive interior spaces. By referring to the famous Winston Churchill's quote "We shape our buildings; thereafter they shape us" (Parliament, 1943), an interior space too plays a role in facilitating activities and values which defines who we are. In additional to that, space could also notify wealth which might affect our social status (Foye, 2017). Our feeling towards a space and its spatial quality is based on how we understand the volume and size of the space. This could be explained by imagining ourselves being in a living room as compared to the feeling of being inside a bedroom. The feeling will be totally different as the designated function and intimacy level of a living room is more to family interactions and semi-private while bedroom is designated to be a private space with higher security and privacy level. The scale and size of an interior space is highly associated with our lifestyles and behaviours as well, taking the example of UK, having group of friends around, sitting silently and eat as a family is one of the end product due to limited space (Robert-Hughes, 2011).

1.6 Fenestration of Interior Spaces

From architecture point of view, the term "Fenestration" is defined as "The arrangement of windows in a building" according to Oxford Dictionary (Oxford English Dictionary (2nd Edition), 1989). Being one of the important components of a building, windows decide where and how much of daylight coming into the interior spaces and how efficient will the natural ventilation be. By comparing two rooms with different numbers of fenestrations installed, the room with more openings will draws in more daylight to highlight the building elements, materials, spaces, textures and others (TPC, 2017). It is also very crucial to note that windows are the parts of an interior space which connect it to the environment outside to form connectivity and prevent sense of disorientation (Walden, 2018).

2.0 Methodology

This research paper is carried out based on quantitative research methodology where data collection is done through questionnaire distribution to respondents. The questionnaire is in the form of pictorial questionnaire using images rendered from computer 3D visualization. Based on all the data collected, analysis and synthesis are carried out to address the research questions and research objectives.

2.1 Selection of Materials

In this research paper, 4 primary materials which are widely used in architectural field are investigated and studied. The list of materials is as following: MT01-Timber, MT02-Concrete, MT03-Brick and MT04-Stone. The materials are chosen based on their popularity for being used in Malaysian construction industry (Abdul Kadir Bin Marsono, 2015).

2.2 Pictorial Questionnaire

Pictorial questionnaire contains pictures to promote interest and help to visualize the imaginary images among respondents so that they will have a guidance and better understanding of the objective of the questionnaire. Although it could be found usually in children textbooks and study materials, but when it comes to the field of architecture, it is one of the effective ways to collect data from the respondents' aesthetical viewpoints. In this research paper, the respondents are youngsters from different educational and racial backgrounds. This research paper includes 3D visualization of a living space using computerization as medium. The similar space is then rendered into spatial images which made up of different materials. All of these images are then included as part of the questionnaire to be answered, examples of rendered images (Figure 3, Figure 4, Figure 5 & Figure 6):

Figure 3 *Rendered Image of a Living Space Finished with MT01-Timber.*

Figure 4 *Rendered Image of a Living Space Finished with MT02-Concrete.*

Figure 5 *Rendered Image of a Living Space Finished with MT03-Brick.*

Figure 6 *Rendered Image of a Living Space Finished with MT04-Stone.*

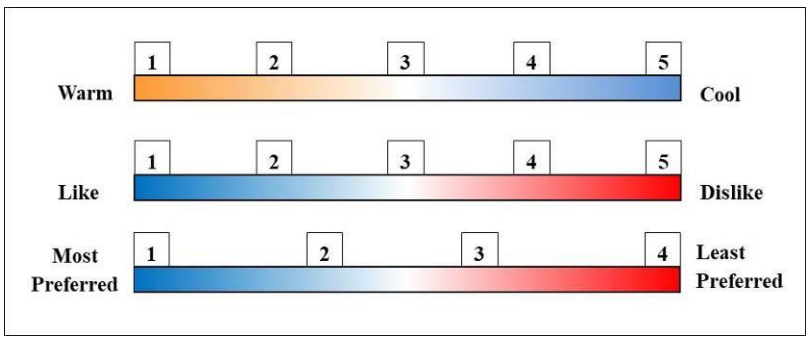


Figure 7 *Scales of Warmness, Likert and Preference*

2.3 Measurement of Data

The collected data are analysed using the Scale of Warmness, Likert and Preference as shown in Figure 7 above.

2.4 Selection of Space

As people feel and experience differently in different spaces due to designated space function, volume, scale and proportion, it is necessary to fix the space to be studied and make it as a constant variable. In this research paper, the living space is selected as the space to be studied. Therefore, a 3D computerized model of a living room is built as a basic unit for research.

2.5 Selection of Study Ground and Respondents

The target group of this research is focused on the Malaysian youngster population from different educational and racial backgrounds. In this research paper, students from University of Malaya (UM) have been selected and classified into 3 groups according to the nature of their respective field of studies. The list is as below:

2.5.1 Architecture

- Defined as "the art and practice of designing and making buildings"
- The students undertaking the architecture program will be learning on how to plan and design buildings or other relevant structures.
- Spatial design-based and construction industry-related.

2.5.2 Civil Engineering

- Defined as "the work of designing, building, and repairing large public structures such as roads, bridges, water systems, and airports"
- The students learn how to design and construction of projects, financing them and managing the construction process. However, their designs are mainly focusing on the structural performance which is different from architectural design.
- Non-spatial design-based and construction industry-related

2.5.3 Biomedical Engineering

- Biomedical Engineering (BME) is a multidisciplinary STEM field which links engineering with biology and implement engineering principles and materials to healthcare and medicine (Mendeley Ltd., 2018).
- The students learn how to apply engineering principles and design concepts to solve problems in medicine and biology.
- Noted that BME is a field that does not have any direct relation to the construction industry.
- Non-spatial design-based and non-construction industry-related.

3.0 Result and Discussion

3.1 Respondents' Demographic Information

The respondents of this research are from the youngster population of different educational and racial backgrounds. As shown in Figure 8 below, 59 (66%) respondents are Malay, 15 (17%) are Chinese, 3 (3%) are Bumiputera other than Malay and 13 (14%) are International students. Referring to Figure 9, equal numbers of 30 respondents are picked randomly from each of the educational program namely: Architecture, Biomedical Engineering and Civil Engineering

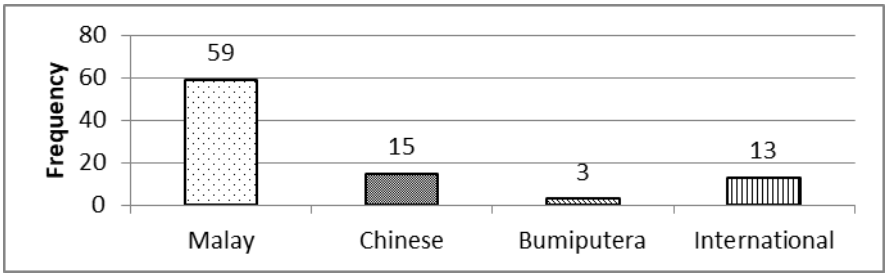


Figure 8 Respondents' Racial Composition

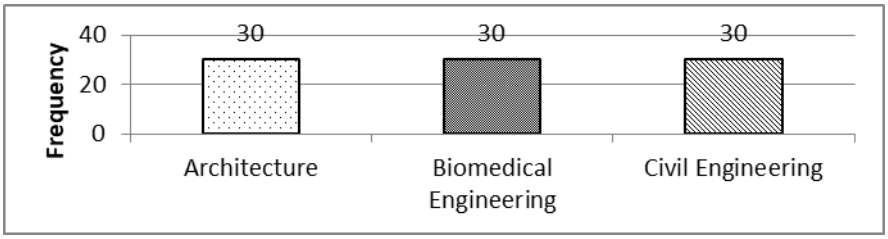


Figure 9 Respondents' Educational Background

3.2 Respondents' Preference on Interior Space Finishing Materials

A series of computer rendered images (Figure 10, 11, 12 & 13) are displayed to the respondents as reference for them when answering the questionnaire. The results of the respondents' preference on finishing materials of interior space are tabulated in Table 2 & 3.

Figure 10 *Living Room with Timber Panel Walls, Floor and Ceiling. (Code B1)*

Figure 11 *Living Room with Cement Finished Reinforced Concrete Walls, Floor and Ceiling. (Code B2)*

Figure 12 *Living Room with Brick Walls, Ceramic Tiled Floor and Plaster Ceiling. (Code B3)*

Figure 13 *Living Room with Stone Veneer Walls and Stone Textured Floor and Ceiling. (Code B4)*

Table 2 *Respondents' Preference on Interior Space Finishing Materials as Compared to Racial Groups*

Races	Most Preferred	Preferred	Less Preferred	Least Preferred
Overall	B1-Timber (2.09)	B3-Brick (2.46)	B4-Stone (2.67)	B2-Concrete (2.79)
Malay	B1-Timber (2.19)	B3-Brick (2.56)	B4-Stone (2.56)	B2-Concrete (2.69)
Chinese	B1-Timber (1.60)	B3-Brick (2.13)	B4-Stone (3.07)	B2-Concrete (3.20)
Bumiputera (Native)	B3-Brick (1.67)	B1-Timber (2.00)	B2-Concrete (3.00)	B4-Stone (3.33)
International	B1-Timber (2.23)	B3-Brick (2.54)	B4-Stone (2.54)	B2-Concrete (2.69)

From Table 2, generally, the Room B1-Timber is the most preferred interior space by the respondents, especially among the Chinese respondents but exclude the Bumiputera respondents. The Room B2-Concrete is rated as the least preferred interior space by all the racial groups except for the Bumiputeras. Both the Chinese and Bumiputera respondents show a high intolerance towards concrete interior space. The Room B3-Brick is the 2nd preferred interior space by the respondents after B1-Timber. The Room B4-Stone is the 2nd least preferred interior space after Room B2-Concrete.

Table 3 *Respondents' Preference on Interior Space Finishing Materials as Compared to Educational Backgrounds*

Educational Background	Most Preferred	Preferred	Less Preferred	Least Preferred
Overall	 B1-Timber (2.09)	 B3-Brick (2.46)	 B4-Stone (2.67)	 B2-Concrete (2.79)
Architecture (AR)	 B1-Timber (1.73)	 B4-Stone (2.53)	 B3-Brick (2.70)	 B2-Concrete (3.03)
Civil Engineering (CE)	 B1-Timber (2.10)	 B3-Brick (2.40)	 B2-Concrete (2.53)	 B4-Stone (2.97)
Biomedical Engineering (BME)	 B3-Brick (2.27)	 B1-Timber (2.43)	 B4-Stone (2.50)	 B2-Concrete (2.80)

From Table 3, Room B1-Timber is the most preferred interior space by the respondents, especially among the AR respondents but exclude BME respondents. Room B2-Concrete is rated as the least preferred interior by both AR and BME respondents but it is rated as the 2nd least preferred interior space by the CE respondents. Preferences for Room B4-Stone and Room B3-Brick fluctuate for different educational backgrounds.

By concluding the data from Table 2 and 3, the Room B1-Timber is ranked as the most favoured and preferred interior space by the respondents where 42% of the respondents ranked Room B1-Timber as the most preferred interior space among the 4 rooms with different material finishes and 19% ranked it the 2nd most preferred interior space. Among the respondents who like the MT01-Timber, 74% of them are because of the colour tone of the material and 67% are because of the naturalness of the material. The colour tone of MT01-Timber as displayed to the respondents is in brown which evokes feelings of warm, secured, comfortable and stable as explained in Chapter 2. The Room B3-Brick is ranked as the 2nd preferred interior space after Room B1-Timber where 22% of the respondents ranked B2-Brick as the most preferred interior space among the 4 rooms with different material finishes and 37% ranked it the 2nd most preferred interior space. The repeating orders of the brick masonry arrangement evoke another aesthetic experience among the respondents, causing them to rank Room B3-Brick as the 2nd preferred interior space.

The Room B4-Stone is ranked as the 2nd least preferred interior space. Among all the respondents who dislike the Room B4-Stone, 52% is because of the stone material being utilized too much throughout all the walls, creating a maze-like, chaotic feeling while 39% is because of the colour tone of the room which appeared to be too grey and lifeless. The Room B2-Concrete is ranked as the least preferred interior space among the 4 rooms with selected materials. Among all the respondents who dislike the Room B2-Concrete, 58% is because of the overall colour tone of the room which is too grey and it evokes feeling of cool, boredom, lost and dullness. If the designer insists on using concrete as the main finishing materials but wanted to maintain end users' satisfaction for the interior space, the designer could actually change some of the wall surfaces or flooring materials into something different from concrete, preferably some warm material to balance off the negative effects of pure concrete finishes.

3.3 Respondents' Preference on Interior Space with Combination of Finishing Materials

Another set of computer rendered images namely Figure 14, 15, 16 & 17 are displayed to the respondents to study on the respondents' preference on interior space with mixture of finishing materials and the results are tabulated in Table 4 & 5.

Figure 14 *Living Room with only Timber Finishes and it represents a Space of Pure Warmness. (Code B5)*

Figure 15 *Living Room with Mixed Finishes made up of Timber, Bricks and Tiles and it represents a Space of Mixed Warmness. (Code B6)*

Figure 16 *Living Room with Mixed Finishes made up of Stones and Concrete and it represents a Space of Mixed Coolness. (Code B7)*

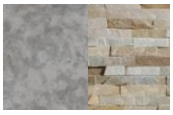
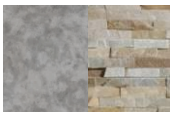
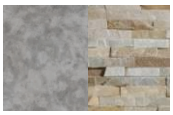
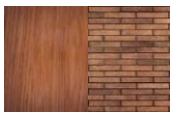
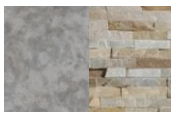
Figure 17 *Living Room with Mixed Finishes made up of Concrete and Bricks and it represents a Space of Warm-cool Mixture. (Code B8)*

Table 4 *Respondents' Preference on Interior Space Finishing Material Combinations as Compared to Racial Groups*

Races	Most Preferred	Preferred	Less Preferred	Least Preferred
Overall	B8-Concrete & Brick (2.20)	B6-Timber & Brick (2.33)	B5-Pure Timber (2.60)	B7-Concrete & Stone (2.87)
Malay	B8-Concrete & Brick (2.03)	B6-Timber & Brick (2.51)	B5-Pure Timber (2.66)	B7-Concrete & Stone (2.80)
Chinese	B6-Timber & Brick (1.73)	B5-Pure Timber (2.27)	B8-Concrete & Brick (2.60)	B7-Concrete & Stone (3.40)
Bumiputera (Native)	B6-Timber & Brick (1.33)	B5-Pure Timber (2.33)	B8-Concrete & Brick (2.67)	B7-Concrete & Stone (3.67)
Inter-national	B8-Concrete & Brick (2.38)	B7-Concrete & Stone (2.38)	B5-Pure Timber (2.46)	B6-Timber & Brick (2.77)

Table 4 showed that the Room B8-Concrete & Brick is the most preferred interior space by the Malay and International respondents while the Room B6-Timber & Brick is the most preferred interior space by the Chinese and Bumiputera respondents. The Room B7-Concrete & Stone is the least preferred interior space by the Malaysian respondents but it is one of the most preferred interior spaces by the International respondents together with B8. The Room B5-Pure Timber is more preferred by the Chinese and Bumiputera respondents but less preferred by the Malay and International respondents.

Table 5 *Respondents' Preference on Interior Space Finishing Material Combinations as Compared to Educational Backgrounds*

Educational Background	Most Preferred	Preferred	Less Preferred	Least Preferred
Overall	 B8-Concrete & Brick (2.20)	 B6-Timber & Brick (2.33)	 B5-Pure Timber (2.60)	 B7-Concrete & Stone (2.87)
Architecture (AR)	 B6-Timber & Brick (2.23)	 B8-Concrete & Brick (2.33)	 B5-Pure Timber (2.37)	 B7-Concrete & Stone (3.07)
Civil Engineering (CE)	 B8-Concrete & Brick (2.17)	 B6-Timber & Brick (2.33)	 B5-Pure Timber (2.47)	 B7-Concrete & Stone (3.03)
Biomedical Engineering (BME)	 B8-Concrete & Brick (2.10)	 B6-Timber & Brick (2.43)	 B7-Concrete & Stone (2.50)	 B5-Pure Timber (2.97)

From Table 5, The Room B8-Concrete & Brick is the most preferred interior space in overall and for both CE and BME respondents while the Room B6-Timber & Brick is the most preferred interior space by AR respondents. The Room B7-Concrete & Stone is the least preferred interior space by both AR and CE while the Room B5-Pure Timber is the least preferred interior space by BME.

By summarizing the data from Table 4 and 5, four combinations with each representing different feeling are compared:

1. B5-Pure Timber which represents pure warmness
2. B6-Timber & Brick which represents mixed warmness
3. B7-Concrete & Stone which represents mixed coolness
4. B8-Concrete & Brick which represents warm-cool mixture

It is found that the respondents prefer the Room B8-Concrete & Brick the most where 36% of the respondents ranked Room B8-Concrete & Brick as the most preferred interior space among the 4 rooms with different mixture of finishing materials and 27% ranked it as the 2nd most preferred interior space.

The results showed that the respondents prefer an interior space made up of a variety of finishing materials. It is explainable for it creates a more diverse spatial experience which in turn provokes more positivity and visual contentment among the dwellers. The Room B8-Concrete & Brick celebrates diversity in terms of materials mixture where concrete of cool nature is mixed with brick of warm nature, fostering a balanced materiality relationship.

3.4 Respondents' Preference on Interior Space in Terms of Color Tone

In order to study the respondents' preference on colour tone of finishing materials of interior space, the Figure 18 & 19 are shown to the respondents for comparison and the results are shown in Figure 20.

Figure 18 *Living Room with finishes made up of lighter toned timber panels. (Code C1)*

Figure 19 *Living Room with finishes made up of darker toned timber panels. (Code C2)*

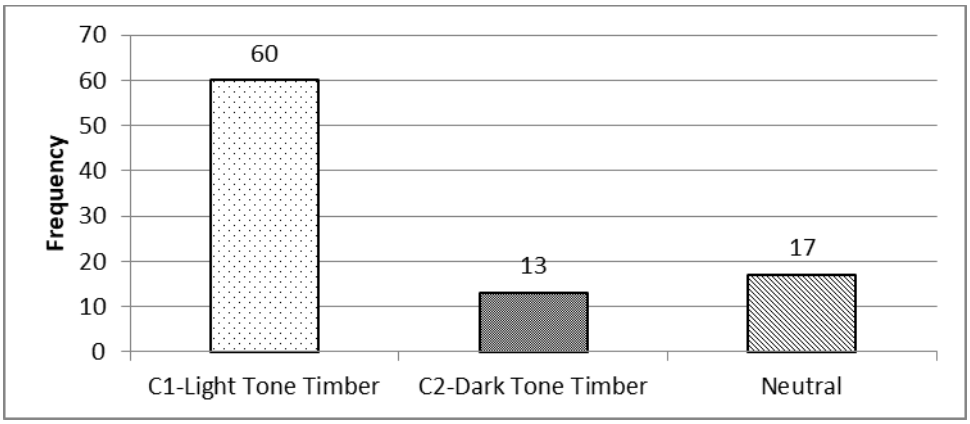


Figure 20 *Respondents' Preferences on Colour Tone of Interior Space*

From Figure 20, 67% of the respondents prefer the Room C1-Light Tone Timber compared to 19% who prefer Room C2-Dark Tone Timber. The remaining 14% respondents remain neutral.

This is explainable by referring to the previous study done on the impact of colour on psychological mood which proven that respondents experienced lowest mood and emotional state within a dark room (Rikard Küller, 2006). A dark room made up of darker toned materials reduce visibility of an interior space especially when there is no any day lighting or artificial lighting designated to light up certain dark corners. The presence of the dark corners will create a gloomy and haunted image for that

room. Therefore, when designing a living room, it is important for the designers to have great considerations on either to choose a light toned finishing materials or utilize day lighting or artificial lighting to ensure a cheerful and friendly ambience for the living room.

3.5 Respondents' Preference on Interior Space in Terms of Spatial Volume

As we experience different emotional feelings in spaces of different volume, it is crucial to study the respondents' preference on that. Thus, Figure 21 & 22 is displayed to the respondents for the respondents to compare spaces made up of different volume and the results are shown in Figure 23.

Figure 21 *Living Room with finishes made up of brick walls, ceramic tiled floor and plaster ceiling within single storey. (Code D1)*

Figure 22 *Living Room with finishes made up of brick walls, ceramic tiled floor and plaster ceiling with double volume design. (Code D2)*

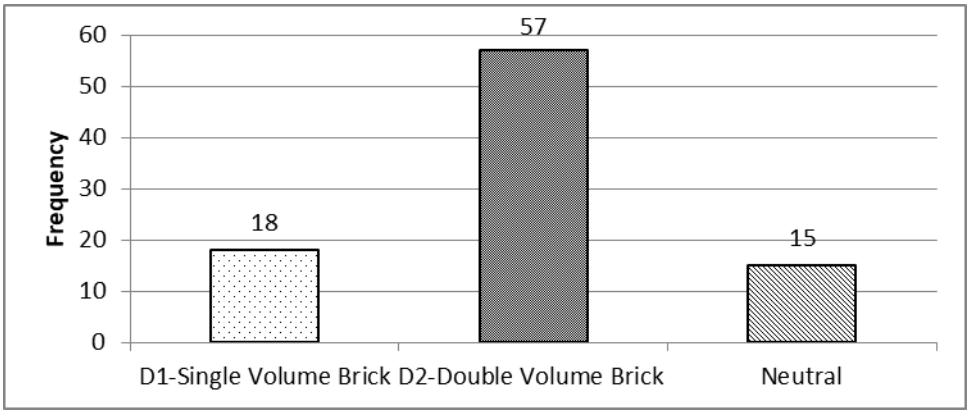


Figure 23 *Respondents' Preferences on Double Volume Design of Interior Space*

From Figure 23, 63% of the respondents prefer the Room D2-Double Volume Brick compared to 20% who prefer Room D1-Single Volume Brick. The remaining 17% respondents remain neutral.

It is explainable by the following facts: A living room is designated as the primary gathering space for a family or community within a house where a lot of human interactions will happen here. Thus, by having a double-volume design in the living room, it provokes grand and welcoming feelings among the dwellers which will in turn encourages more interactions.

Other than that, a double-volume space will creates more seamless flow between the interior and exterior where the dwellers will have a wider view vertically towards the outside and the sky (Andreas Vogler, 2005). This will also increase the amount of day light intake into the space. If it is possible, the designers could always propose a double-volume design for the psychological benefits of the dwellers.

3.6 Respondents' Preference on Interior Space in Terms of Fenestrations

Fenestration is an important element to emphasize on when designing a space for it impacts differently on the dwellers' experience. Figure 24 & 25 are displayed to the respondents to study the respondents' preference on fenestration allocation of an interior space. The results are shown in Figure 26

Figure 24 *Living Room made up of stone veneer walls and marble finished ceiling and floor designed with more openings compared to Figure 13. (Code E1)*

Figure 25 *Living Room made up of stone veneer walls and marble finished ceiling and floor designed with less openings compared to Figure 12. (Code E2)*

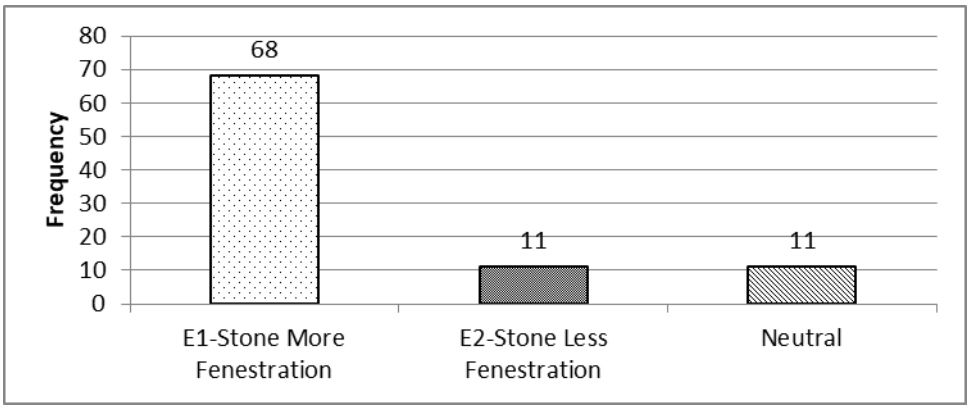


Figure 26 *Respondents' Preferences on Fenestrations of Interior Space*

From Figure 26, 76% of the respondents prefer the Room E1-Stone More Fenestration compared to 12% who prefer Room E2-Stone Less Fenestration. The remaining 12% respondents remain neutral.

The explanation for this result is based on the day light quantity: More fenestrations will ensure a greater amount of day light intake into the space but too much fenestrations will brought in unwanted excessive heat as well.

Day light is indeed a must for a healthy interior space including living room for it not only naturally lights up the interior space but also helps to refresh our minds and inject positivism into our daily life (Wen-Bin Chiou, 2013). It is the job of the designers to find a balance in the quantity and design of fenestration according to the function and the user groups.

4.0 Conclusion

This research paper studied on the Perceptions of Youngsters on Interior Space Quality in Relation to Materiality and Spatial Design and found out that the respondents prefer the material MT01-Timber the most due to the colour tone and the naturalness of timber. It was followed by MT03-Brick as the 2nd preferred materials by the respondents. The material MT04-Stone is ranked as the 3rd preferred materials while MT02-Concrete is the least preferred material by the respondents. MT02-Concrete is disliked by the respondents for its boring, dull and gloomy grey colour tone together with its unfinished and raw surface. When comparing interior space finished with mixture of materials, the results showed that the respondents generally prefer the warm-cool mixture (MT02-Concrete and MT03-Brick) the most for its richness and variety in spatial visual experience while the mixed-coolness (MT02-Concrete and MT04-Stone) is the least preferred combination by the respondents for its coolness and boring greyish colour tone. In additional, the respondents prefer a light toned interior space than a dark toned interior space; prefer a double-volume design over plain single volume design and prefer more fenestrations in an interior space.

Lastly, the suitable interior spaces for Malaysian youngsters from different backgrounds in terms of spatial quality and materiality are concluded as Table 6 below:

Table 6 Conclusion on suitable interior spaces for Malaysian youngsters from different backgrounds in terms of spatial quality and materiality.

Conclusions
Preferences on Finishing Materials: Timber > Brick > Stone > Concrete
Preferences on Finishing Materials Mixtures: Warm-Cool Mixture > Mixed Warmness > Pure Warmness > Mixed Coolness
Preferences on Spatial Colour Tone: Light Toned > Dark Toned
Preferences on Spatial Volume: Double-volume > Single-volume
Preferences on Fenestrations: More Fenestrations > Less Fenestration

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