

EMPLOYEE'S PERCEPTION AND PREFERENCES TOWARDS IMPLEMENTING BIOPHILIC DESIGN IN WORKSPACE

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Most of Malaysian spend one third of their time per day in an office workspace to be productive and contribute to their work or career. An office workspace should be designed to enhance productivity and creativity, by regulating or balance the mental and physical health of employee. The key to create such conducive working environment is through stress free, and restorative environment, which could be achieve through incorporate of biophilic design. This paper attempts to find out the current office environment and ways to achieve a stress-free office workspace environment through the implementation of biophilic design approach into office building. Also, to find out does building occupants appreciate or accept biophilic elements. Based on a review of literature of biophilic design, a checklist has been formed to find out the availability of biophilic element in KOMTAR. A Survey has been done to acquire user satisfaction of current workspace environment, along with perception and preference of biophilic design. The findings show that, the biophilic design approach is acceptable and viable generally. Building occupants had also chosen the choice given in the biophilic perception survey, that they wish to have biophilic elements and more nature connectivity in the workspace. Therefore, as an architect we should design a workspace there is more nature connected and ensure user experience a comfortable and healthy environment.

Keywords: Workspace, Office building, biophilic design, Employee's perception, Biophilic workspace

1. INTRODUCTION

Malaysia as a developing country, still faces a lot of challenges that yet to be overcome, and one of the challenges is country's economy. A developed country needs to be progressive, prosperous, and equitable in its economy, according to Prime Minister's Office of Malaysia (PMO) vision 2020. Productivity is one of the key factors of affecting the country's economy of achieving a high-income and developed country based on the Malaysia Productivity Corporation (MPC) productivity report. In addition, under the Eleventh Malaysia Plan (11MP) of striving towards the vision 2020, has already highlighted the importance of human capital development under Pillar 4: Empowering Human Capital, in

improving efficiency and working productivity. Ulrich Zachau, World Bank Country Director for Southeast Asia, stated that the key to economy growth and prosperity in Malaysia is by raising the country's productivity.

2. PROBLEM STATEMENT

Since the twenty-first century then modern civilization has shifted the human life into spending more time in a controlled internal environment. Workspace, is where human spent at least quarter of their lifetime at, making it one of the high potential space that influence the user health, morality and productivity (Loftness et al., 2003). Chandrasekhar (2011), and Sundstrom, Town, Rice, Osborn and Brill (1994) claims that

employees cognitive and emotion, behavior, performance, and abilities are influenced by the workplace environment due to long hour of stay within the environment. stress from work has cause a critical issue in safety, health and social wellbeing aspect in an occupation (Williams and Cooper, 2002). An individual could be vulnerable physiologically and psychologically when they experience work stress (Beehr and Newman, 1978).

Meanwhile in Malaysia, the issue of stress pertaining to work has caused Malaysia employee to be in higher risk related health. In recent years 2018, AIA Vitality has conducted a survey of workplace and has disclosed that workers or employees of Malaysia have work more hours and devoted more hour in their workplace than resting at home or other personal activities, losing the balance between work and life. The survey also showed that stressed of work has caused employee to have sleeping issue and mental health issue like depression and anxiety. It also results in increase of absentee to work due to work environment quality and job dissatisfaction and leads to employee loss of productivity and loss of company revenue (AIA Vitality, 2018). This negative impact may be caused by the work environment they stayed, and possibly our workspace environment indirectly affects our behavior. As studied, an employee's psychology is represented of their environment (Piko, 2006). Among many ways to make the workplace a more productive, fun and less stress place, Biophilic design is one of the approaches to create such environment.

3. RESEARCH QUESTIONS & PURPOSED

This section will present a close reading of Lefebvre's revolutionist perspectives of urban form. 'Urbanism' is a specific term which Lefebvre often calls to address his criticism. In order to understand the rise of Lefebvre's urban critique, it is essential to first allocate recognitions for the particular background. Speaking in the context of after world-war and massive deconstruction; urban restructuring of state-led urbanism; formation of neoliberal economy and scientific intervention; of all

- i. What is the current situation of the office workspace?

- ii. How is the perception of user towards biophilic design?
- iii. What is user preference of biophilic element that matters to them?

This research paper, focus to discover user's satisfaction level on current office condition. This is to what is user satisfaction without the biophilic design. Second, to find out user's perception of biophilic design. This is to understand whether users, appreciate the approach of biophilic design. Lastly, to determine user's preferences on implementing biophilic design in their workspace.

4. METHODOLOGY

The research methodology adopted for this paper is by choosing a case study office building to carry out a survey from the user opinion and perception on the current work environment, perception to biophilic design and preference. The finding of the study is mainly based on the primary source of data which are made up of case study selection, site visit, and comparative research. Information of selected cast study will first be obtained through online resources, and then followed by the visit of case study to obtain accurate data of building.

At the same time correlation will be carry out to identify the potential or existing biophilic elements of the building. A literature review has also been done, cover substantive topics of element and strategies of biophilic design, review previous idea and concept of biophilic design. Origin and history of office workplace were review and current office design is studied to understand the layout space of selected building. Findings has been tabulated into Availability, potential, and user preference of biophilic design element.

Case study selected is KOMTAR tower building in Penang, Malaysia. Located at Georgetown of Penang, this building consists of 68 level high of office space, with built-up area of 765,100 square feet. The selection of this case study is due to the time constraint and limitation, that the data collecting is viable for this research studies. it is a government base office tower, and government should be as a role for new intention of approach. This building also located in an urban setting, which is also the intended approach this study for, to rethink or create awareness of office workspace design in city. The availability and potential of biophilic element in the KOMTAR will be checked through a site visit

following the guide of 14 biophilic pattern show in the Table below. The basic information for building photos and plans is shown in the followed figures.

Category	Patterns
Nature in the space patterns	Visual Connection with Nature
	Non-Visual Connection with Nature
	Non-Rhythmic Sensory Stimuli
	Thermal & Airflow Variability
	Presence of Water
	Dynamic & Diffuse Light
	Connection with Natural Systems
Natural Analogues Patterns	Biomorphic Forms & Patterns
	Material Connection with Nature
	Complexity & Order
Natural of the Space patterns	Prospect
	Refuge
	Mystery
	Rick'Peril

Figure 1: Case study biophilic checklist

Questionnaire was then carried out through online survey by using google form. Online survey was distributed to users and employee of KOMTAR tower in Penang. Before the questionnaires were distributed to the target group, a pilot study was conducted to obtained feedbacks from general employee and, also to check whether the generated questions are comprehensive to general people. The pilot study was distributed to 8 general employees. Questionnaires are generated into 4 sections, covering first topic on demographical data, second topic on current situation of workspace, third topic on perception of biophilic design, fourth topic on preference of design. The perception and preference attributes are based on Stephen R. Kellert theory, and with respondent personal perception and preference to biophilic element. A likert scale (Likert, 1932) is used in this research and applies in 2nd, 3rd, and 4th section.

5. FINDINGS

This chapter begins with current situation of KOMTAR workspace analytically discussed what are the people's perception of their current workspace. Followed by their perceptions towards biophilic design and elements, and choices are given to them for their preference of biophilic elements. Lastly, suggestion and recommendation will be discussed.

5.1 SITE OBSERVATION

Identification of biophilic element availability and potential in KOMTAR. Data of availability of biophilic element in office area of KOMTAR has been concluded in figure 15 that there is not intend of biophilic element in the space at all. However, space has been analysed for potential biophilic element to be implement. From the office tower plan shows, availability of Dynamic & diffuse light, Connection with natural systems, Prospect of view, refuge, and rick'peril.

Category	Patterns	Availability	Potential	Respondent preference
Nature in the space patterns	Visual Connection with Nature	X	√	
	Non-Visual Connection with Nature	X	√	
	Non-Rhythmic Sensory Stimuli	X	√	
	Thermal & Airflow Variability	X	X	
	Presence of Water	X	√	
	Dynamic & Diffuse Light	√	√	
	Connection with Natural Systems	√	√	
Natural Analogues Patterns	Biomorphic Forms & Patterns	X	√	
	Material Connection with Nature	X	√	
	Complexity & Order	X	√	
Natural of the Space patterns	Prospect	√	√	
	Refuge	√	√	
	Mystery	X	X	
	Rick'Peril	√	√	

Figure 2: Availability and Potential biophilic element in KOMTAR office area.

From the observation through site visit as shown in figure 3, there is no availability of plants, nature elements, or connection with natural systems. However, the application of material connection with nature can be found on the flooring material, that has stone texture but poorly bring out the awareness. As shown in the typical tower plan below Figure 4 that the corridor side are fully enclosed. So, in terms of light and ventilation shall apply fully mechanical and artificial. However, potential of biophilic element applicable to this area is green elements and plants, presence of water, material connection with nature, biomorphic forms & patterns design elements. On the office area the space has 360 degrees of views and allows daylighting penetration, exposed to exterior.

5.2 QUESTIONNAIRE

The questionnaire is participated by 106 of respondents where they are all worked in KOMTAR tower, government base office. All questionnaire is completed via online survey, and total of 4 section to complete the survey. 4 section which consist of, first section A demography to get the general information of respondent which later could be used to compare as a factor of data

variation. Followed by section B, Current situation of workspace, which is to identify respondent current workspace situation and their experience with it. Thirdly, section C perception of biophilic design, this section identify how biophilic element matters to them and perception towards it. Lastly, section D Preference of design, would identify which biophilic element respondents preferred to have in their workspace environment.

User's current situation

Majority of the respondents has neutral opinion regarding the fixed workspace, which they are fine with the current fixed workspace and adaptable to non-fixed or new workspace. Those respondents who has agreed or strongly agreed that they like their workspace, are likely staff who has their own personal room of workspace. Another factor is most of the staff has work long period of time in the same environment with the same employer, that respondents has adaptably comfortable with the current workspace.

Q2. Availability of plants in current workspace.

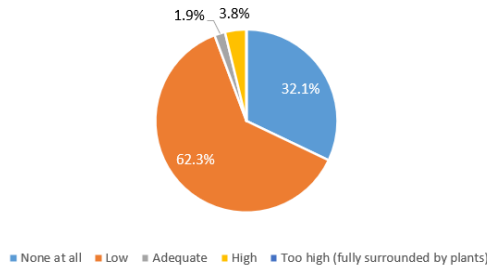


Figure 3: Pie chart of respondents from Q2

In terms of plants availability in KOMTAR workspace has very low of plants and green in the workspace. Only a few of respondent has adequate and high plants in their current workspace. The factor of person workspace decoration and personal room of workspace. So, the current workspace of KOMTAR has potential to enhance this part, by providing plants and green elements into the space.

Q3. The air quality at my workspace is good and fresh; not dusty, no bad odor, good humidity level.

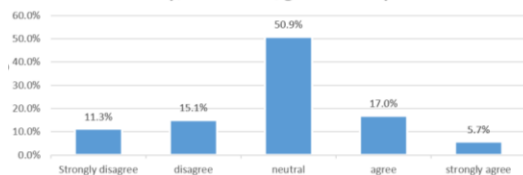


Figure 4: Column table of respondents from Q3

Excluding the neutral responses, most respondents has responded negatively towards the air quality of their current workspace. The factor that the environment has not been upgraded and fully enclosed space with use of air-conditioning system, caused the air quality no refreshing. Most of the respondents responded that they have low or none at all of window view externally. From the following question do they look at the exterior scenery from office window to relax their eyes or a short break, most respondents agreed and strongly agreed that they do so. This shows that the need of exterior view and window view is important to them.

Q9. The lighting ambience in my office workspace is conducive and comfortable, and I'm satisfied to work in.

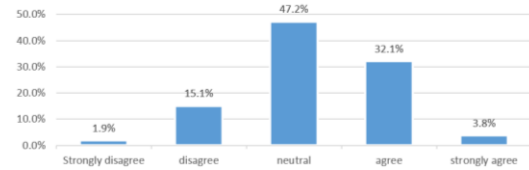


Figure 5: Column table of respondents from Q9

Studies has proved daylighting and views has the natural healing effect, boost a person mood and provides a connection with outdoor. Most of the respondents responded that they have low or none at all access to natural lighting (L. Gelfand, E.C. Freed). However, from the following data of the satisfaction on lighting ambience in their office workspace, most are being neutral and agreed to satisfied with their current lighting ambience. The data showed they are adapted to their current lighting ambience and does not have much opinion on it. On the condition of natural lighting in their workspace, more than half of the respondents have low or none natural lighting at all. This indicates the potential improvement can be made on enhance the accessibility of natural lighting in tower office area.

Q13. In overall, I'm satisfied with my current office workspace environment.

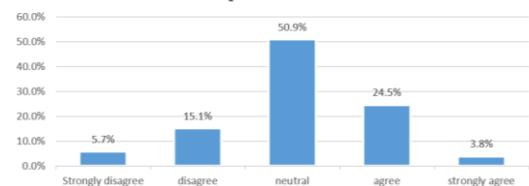


Figure 6: Column table of respondents from Q13

Most respondents being neutral on the satisfaction of their current workspace, could the

factor of respondents has worked a long period of time in the same workspace and employer, and somehow adapted to the average work environment. This indicates the potential for enhance to the office are in KOMTAR is viable.

Biophilic perceptions

Respondents has responded to be in an outdoor-like surrounded environment majorly. More than half of the respondent has preferred to work in an environment that is surrounded by green than a conventional office environment. Respondents also believe that abundant of green and plants in workspace will helps freshen the air quality, as well as visually improving user's well-being.

In terms of presence of water, respondents also responded positively to enjoy hearing sound of water flow while working. This signify adding water element into the current workspace is also a viable to them. Majority of the Respondents also agreed and strongly agreed that visual contact to nature elements like plants, water feature and sky etc., help them in stress relieve and calm.

Category	Patterns	Availability	Potential	Respondent preference
Nature in the space patterns	Visual Connection with Nature	X	√	√
	Non-Visual Connection with Nature	X	√	√
	Non-Rhythmic Sensory Stimuli	X	√	√
	Thermal & Airflow Variability	X	X	√
	Presence of Water	X	√	√
	Dynamic & Diffuse Light	√	√	√
Natural Analogues Patterns	Connection with Natural Systems	√	√	√
	Biomorphic Forms & Patterns	X	√	-
	Material Connection with Nature	X	√	√
Natural of the Space patterns	Complexity & Order	X	√	-
	Prospect	√	√	√
	Refuge	√	√	-
	Mystery	X	X	-
	Rick/Peril	√	√	-

Among the choice of green element respondents would like to have around their workspace, majority has chosen garden space compared to other given green elements. This is due to the enclosed space of high-rise KOMTAR, that respondents preferred to have an easily accessible outdoor garden withing the workspace. Again, among the choice of water feature respondents would like to have around their workspace, most respondents preferred an indoor waterfall compared to the other feature. This signifies respondents are able to work in a very nature-like environment.

Lastly, given choice of office workspace design setting, 2 major group chos Biophilic workspace design and mix of biophilic and creative setting design. From the choice both appears to have biophilic elements, this signifies

user of KOMTAR appreciate biophilic elements and the applicable of biophilic design is viable.

6. CONCLUSION

i. To discover user's satisfaction level on current office condition.

Respondents has major responded neutral to the satisfaction, which signifies that their workspace environment does not giving a strong impact to them. This mean there is potential gap to make their workspace a more positive impact to them.

ii. To identify user's perception of biophilic design.

From the data has proven that biophilic design elements are generally acceptable and appreciated. Even though, respondents are given choice to decline or deny the biophilic element, still they responded positive it.

iii. To determines user's preference on implementing biophilic design in their workspace.

Three main basic elements have concluded from the survey are, plants and greens, water presence, and material choice to fulfill biophilic design of KOMTAR users. However, material wise, respondents chosen the mix of colourful fun setting.

This studies also proved that biophilic theory is viable generally, that even users are adapted or comfortable with their non-biophilic environment, the space can still be improved through biophilic approach. The fact that nature creates a soothing and healing environment has also been proven in the questionnaire that, general respondents agreed with the statement.

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