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EMPLOYEES' PSYCHOLOGICAL WELL-BEING IN ARCHITECTURAL FIRMS IN KLANG VALLEY, MALAYSIA: IMPLEMENTING HEALTH INDUCED ENVIRONMENT

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Abstract

In architectural firms, where employees spend most of their time indoors, addressing stress and psychological well-being through supportive workplace environments is essential to prevent mental health issues and enhance productivity. This study examines employees' psychological well-being by exploring how space quality factors, such as spatial arrangement, furniture design, noise, lighting, and nature, affect behaviours, productivity, and space efficiency. Thus, to achieve the research objective, a study was conducted using a qualitative method, comprising a questionnaire survey, observations, and computer simulations. The findings reveal that employees value spacious, well-arranged, and private layouts, ergonomic furniture, quiet workspaces, sufficient lighting, and access to fresh air and greenery. They adopt a combination office layout that balances connectivity and collaboration with privacy and reduced distractions to support a health-inducing work environment. Suppose an architectural firm considers these aspects in creating a health-inducing climate. In that case, employee mental health can be protected, leading to a more significant impact on employees, who will, in turn, experience increased productivity and improved work performance.

Keywords: Employees, Psychological Well-Being, Health-Induced Environment, Sustainable

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INTRODUCTION

Employees, especially those in Architectural firms, spend a significant amount of their time indoors, which affects their psychological well-being and influences their productivity and work performance. Many perceive that psychological well-being, such as physical and mental health problems, only refers to those who are insane or mad. Still, the fact is, depression and emotional disturbance can also lead to serious mental illness if not dealt with properly. National Institute of Occupational Safety and Health (NIOSH) Chairman, Tan Sri Lee Lam Thye, proposed that employers at each organisation take into account the risks of stress and psychological well-being aspects of employment, and implement plans to reduce psychological well-being risk so that employees can play a role in creating a healthy work environment (Geraldine, 2017). Employees' satisfaction with the working environment can be improved by minimising aspects that cause mental health problems. Any organisation, regardless of the extent to which people work remotely, needs to consider the well-being of its employees as it implements more flexible working practices and an environment (Neuert, PhD, 2018).

Tan Sri Lee Lam Thye also pointed out that there are five categories of health risks at the workplace – physical, chemical, biological, ergonomics and psychosocial – adding that stress falls under the psychosocial category (Geraldine, 2017). Anxiety is one of the psychological illnesses that was stimulated by some of the risks in the workplace. One of the risks is that employees can feel like they are in an invisible cage, keeping them a prisoner on their sofa, unable to move for fear of something they cannot quite identify (Newman, 2018). Tim Newman, in Medical News Today (2018), stated that the health ministry can carry out such psychological assessments, and the results can be used to plan and implement sustainable programs to address mental health issues. He proposed that employers at each organisation take into account the risks of stress and psychosocial aspects of employment, and implement plans to reduce psychosocial risk so that employees can play a role in creating a healthy work environment. Managing stress and psychosocial risks at work creates a healthy work environment, where workers feel valued and the workplace culture is more positive, consequently improving productivity and business performance (Bernama, 2017).

The study was conducted to gain an understanding of the underlying knowledge of psychological well-being, including the basic understanding of employees' behaviour, its determinants, and consequences. A literature review was conducted to determine the objective of this paper, which is to identify the variables of space quality, including furniture design, surrounding noise, direct and indirect lighting, and their preferences for improving work productivity and space efficiency in a specific environment by implementing a health-inducing environment.

RESEARCH BACKGROUND

Based on the literature review, four aspects can impact the creation of a health-inducing environment. The four aspects are discussed below;

1) Impact of the 'Living' building concept

In this context, a building should be 'Living' when it achieves some imperatives: 1) It has to generate its own energy on site using renewable sources, 2) Capture and treat its own water, 3) Be constructed of non-toxic and sustainable sourced materials, 4) Use only previously developed sites and, 5) Be beautiful and inspiring to its inhabitants (Hagezy, 2017). Some factors influence employee performance (Lauby, 2017). In the organisation, the employer might want to compartmentalise the areas differently: organisational processes, physical resources, data and information, individual abilities, motivation, and job knowledge.

2) Impact of good ventilation and lighting

The stack effect may encourage the natural ventilation system of a house, but it may also bring hot and humid air from tropical climate countries into the building. This proper design solution can preserve and improve the temperature of indoor air while simultaneously encouraging air movement to balance the humidity level (Wahab, 2015). Other passive and energy-efficient measures are: the orientation of the building, the use of appropriate building colours, an open plaza between the two blocks to facilitate natural ventilation, and motion sensors for lighting and rain detection to moderate energy and water usage. The use of artificial indoor lighting is minimised by light shelves that reflect daylight deeper into the building, helping to illuminate interior spaces. This eco-design will influence and improve human activities, comfort, and energy (Mutuli, 2016).

3) Impact of connection with nature

Environmental Education (EE) has a substantial impact in reconnecting today's adults with the natural environment, thereby contributing to the creation of more ecologically responsible citizens. The traditional conservation education approach has often disconnected ecosystems and society by protecting species, ecosystems, and landscapes from human negative impacts (Wahab, 2015), rather than recognising that human societies are part of nature and highly interconnected with ecological systems (Sida, 2016). According to Yeang (2016), the building's environmentally friendly design was created with the intention of maximising the advantage of local bio-climatic conditions and minimising the environmental impact on the building. This strategy will improve the building spaces and give social benefits. Due to this opportunity, it can also maximise the effect of natural ventilation by adding greenery around the buildings.

4) Impact of office layout (shop-lot office) on employees' behaviour

There are four types of office layouts (Awang, 2018): 1) Taylorism, 2) Cellular, 3) Open Plan, and 4) Combination office layouts. The cellular office was introduced in the 1950s and could accommodate up to 4-6 employees (See Figure 2). Due to the high demand for productivity and services in the 60s, an open-plan office layout was designed that could accommodate more than 20 employees (See Figure 3). In the late 1960s, the group office (office landscape) was applied in office layouts with ergonomic work environments that could accommodate 6-20 employees in one area. This approach is used to create a more open and collaborative office environment that encourages communication and discussion among employees. In the 1980s, the Combination office layout was widely used, as it provides a communicative space structure that incorporates cellular offices accommodating multi-function spaces and is intended to offer more privacy for employees, especially from noise and visual distractions (See Figure 4).



Figure 1 'Taylorism' office style, where all the employees are monitored by their bosses from an enclosed office.
Source: (LABS, 2017)



Figure 3 An open-plan office was designed to accommodate more than 20 employees.
Sources: (LABS, 2017)



Figure 2 A Cellular office was introduced that could accommodate up to 4-6 employees. *Sources: (Khanna, 2019)*



Figure 4 A Combination office layout was widely used as it provides a communicative space structure. *Sources: (Khanna, 2019)*

METHODOLOGY

The methodology used for data collection and analysis in this research was determined through a review of literature studies from various researchers and authors. Survey questionnaires, observation, and computer simulation were the methodologies employed throughout this paper.

Survey questionnaires were administered using a non-random sampling technique, ensuring that every employee in the firm had an equal chance to answer the questions. This survey utilises 150 questionnaire samples. The information was then evaluated using graphical representations and diagrammatic data, which were subjected to statistical analysis. Next, observations were recorded to detect the occupant's behavioural patterns in the actual setting during office hours. This approach is systematic, outlining what to observe and record.

Lastly, a computer simulation by Space Syntax was implemented after site data collection. An office-based model was built to stimulate and examine the relationships between users and the space layout. The Space Syntax result validation process comprised several stages. The spatial configuration was first analysed using key space syntax measures, including visual connectivity and integration. Empirical observations of user movement and interaction were then conducted to obtain behavioural data. Statistical analyses were performed to assess correlations between spatial metrics and observed behaviour, followed by cognitive validation through user feedback on perceived spatial qualities. Finally, the results were cross-checked with comparable studies to confirm reliability and generalizability. This simulation enables the designer to predict findings through data collection and facilitates users in specifying their requirements. The significance of using computer simulation and evaluation methods, such as Space Syntax Analysis, lies in the fact that the software enables clients to specify their requirements and architects to make informed decisions on allocating activities.

In selecting the case studies, architectural firms were chosen based on a shop-lot typology with a 3-storey height. This typology is chosen because most architectural firms in the Klang Valley areas were set up in shop-lot buildings, thus they will carry the same characteristics to be compared with. Three firms were selected, namely Firm A (ATSA Architects), Firm B (TRHY Sdn Bhd), and Firm C (Archicentre Sdn Bhd). This research used a paper-based questionnaire to evaluate two firms, Firm A and Firm B, and an Online Questionnaire for Firm C, due to time constraints and the firm's regulations. Respondents were asked a few questions using a four-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree."

The collected data were analysed using cumulative percentages and frequency distributions of comfort levels. Graphical and statistical analyses were

then applied to interpret the findings and derive practical insights for promoting health-induced environments in architectural firms.

RESULTS

Questionnaire Analysis

Based on the questionnaire data collection, the results and analysis are presented in Table 1, Table 2, and Table 3.

Table 1 The table shows the main components of the questionnaire with their variables.

No.	Components	Variables
1.	Component 1	Spatial Arrangement
2.	Component 2	Furniture
3.	Component 3	Noise
4.	Component 4	Lighting
5.	Component 5	Preference

Table 2 Spatial Arrangement, Furniture, Noise and Lighting Survey Summary by selected 3 Firms.

No	Description	Agreed Percentage	Disagreed Percentage
1.	Spatial Arrangement		
	I like the position of my current workstation.	75.8 %	24.2 %
	I have enough space to move around and to store my personal belongings.	65.2 %	34.8 %
	I can move easily from one space to another space without obstacles.	62.1 %	37.9 %
	I am comfortable with my workstation arrangement that gives enough privacy.	60.6 %	39.4 %
	The spatial arrangement affects my psychological well-being.	57.6 %	42.4 %
	The spatial arrangement affects my productivity negatively.	47.0 %	53.0 %
	The spatial arrangement affects my work performance negatively.	42.4 %	57.6 %
2.	Furniture		
	The furniture is comfortable enough to do work without getting tired the whole day.	74.3 %	25.7 %
	The ergonomics of my workstation never affect my health problem.	62.2 %	37.8 %
	My current workstation does not affect my productivity.	60.6 %	39.4 %
	The size of my workspace is sufficient enough for me to do my work even when large drawings need to be referred to.	40.9 %	59.1 %
3.	Noise		
	I prefer to work comfortably with noise barrier.	72.8 %	27.2 %
	I prefer to work in quiet and calm environment.	72.7 %	27.3 %

No	Description	Agreed Percentage	Disagreed Percentage
	I can work more productively by listening to music while working.	72.3 %	27.2 %
	Noise or music does not affect my concentration.	57.6 %	42.4 %
	Noise doesn't affect my work performance and productivity.	50.0 %	50.0 %
	My workstation has many noise distractions.	40.9 %	59.1 %
4.	Lighting		
	My workstation is provided with sufficient lighting to complete my task.	84.9 %	15.1 %
	I prefer to obtain fresh air and lighting for me to conduct my work comfortably.	83.4 %	16.6 %
	Ample amount of lighting and openings at my workspace is appropriate.	77.2 %	22.8 %
	Lighting provided doesn't affect my work performance and productivity.	40.9 %	59.1 %

The analysis of workplace environmental factors reveals a positive perception of spatial arrangement, with most respondents agreeing with the availability of space (65.2%), unobstructed circulation (62.1%), and workstation location (75.8%). However, between 42.4% and 57.6% reported negative effects on work performance, productivity, or psychological well-being, indicating spatial issues despite overall adequacy. For furniture, comfort (74.3%) and ergonomic adequacy (62.2%) were positively rated; however, 59.1% found the workspace size inadequate for large-format tasks. Noise was identified as a significant concern, with 59.1% citing frequent distractions; nonetheless, a majority preferred quiet environments (72.7%), noise barriers (72.8%), or music to improve productivity (72.3%). Lighting received the highest ratings, with 84.9% confirming that it provided sufficient illumination, 77.2% noting that it had appropriate openings, and 83.4% valuing access to natural light and ventilation. However, 59.1% indicated that lighting conditions still impacted their performance. These results suggest that while ergonomic and lighting conditions are largely satisfactory, targeted improvements in spatial configuration and acoustic control may be required to enhance both productivity and employee well-being.

Table 3 Preferences Survey Summary by selected 3 Firms.

No	Description	Agreed Percentage	Disagreed Percentage
5.	Preference		
	Natural greenery has a restorative effect and keeps me more focused.	95.9 %	6.1 %
	I prefer to have some green/plants in my workstation area.	92.4 %	7.6 %

No	Description	Agreed Percentage	Disagreed Percentage
	Indoor humidity gives positive impacts on both my comfort and productivity.	92.4 %	7.6 %
	I feel more active and fresher when I have directly or indirectly access towards plants.	90.9 %	9.1 %
	Presence of interior plants will actively affect my performance positively.	84.9 %	15.1 %

Table 3 shows the preference for the presence of greenery within employees' workspace areas. 92.4% of employees preferred to have plants/greenery at their workstations, and 84.8% of them believed that the presence of interior plants would positively affect their performance. 92.4% of the respondents from the three firms agreed that indoor humidity has a positive impact on both their comfort and productivity, and that natural greenery has a restorative effect, keeping them more focused. 90.9% of them also stated that they feel more active and fresher when they have direct or indirect access towards plants. These findings suggest that greenery plays a significant role in promoting both psychological well-being and work performance.

Observation Analysis

Based on observation data collection, the results and analysis are as shown in Table 4.

Table 4 The table below shows the summary of observation of 3 Case Studies

Observations	Firm		
	A	B	C
Space Requirements			
Lobby	/	/	/
Design Studio Areas	/	/	/
Manager Offices	/	/	/
Storage Area	/	/	/
Pantry	/	/	/
Photocopy/ Printing Area	/	/	/
Filing Area	/	/	/
Meeting Area	/	/	/
Discussion Area	/	/	/
Material and Sample Area	/	/	/
Spatial Problems			
Not enough personal Storage	/	o	o
Not enough storage for drawings	/	/	/
Not enough space for common area	/	o	o

Legend: / = Provided o = Not provided

Upon observation, all three firms compartmentalise the areas differently: lobby, workstation, director's room, meeting area, pantry, and storage

area. The observation shows that all three firms meet their basic space requirements for an architectural firm's office. It also shows that most of the offices have insufficient space for larger drawings. Only Firm A has personal storage and common area problems for employees.

Simulation Analysis

Based on simulation data collection, the results and analysis are as shown in Figure 5, Figure 6 and Figure 7.

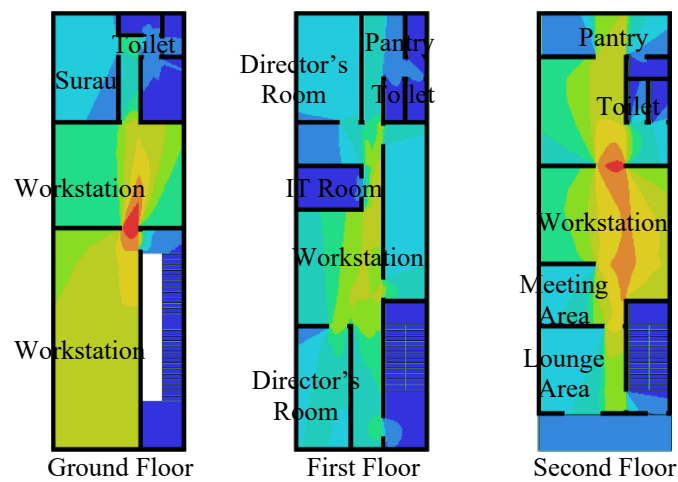


Figure 5 Floor plans for Firm A

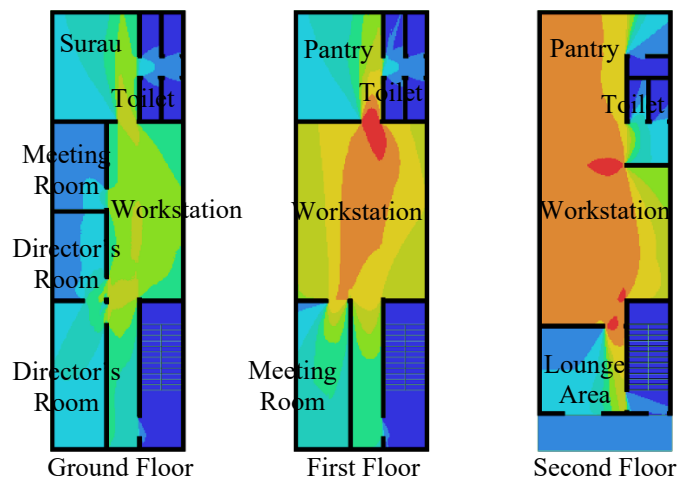


Figure 6 Floor plans for Firm B

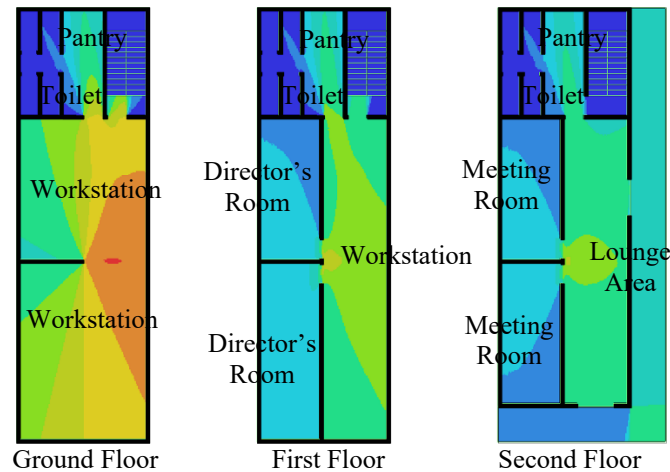


Figure 7 Floor plans for Firm C

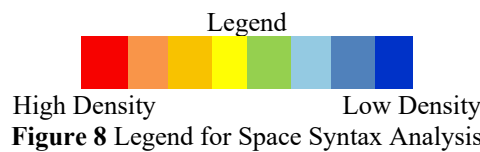


Figure 8 Legend for Space Syntax Analysis

Figure 6 shows that Firm B has the most connectivity among employees due to its open plan arrangements, which have the highest density of spaces on the Second and First Floors. However, a lower density on the Ground Floor, followed by Firm C (Figure 7), where the high density happens on the Ground Floor. In contrast, low density occurred on the First and Second Floors. As for Firm A (Figure 5), due to the office layout, which utilises partitions and drywall, low density is observed on the Ground Floor and Second Floor, with the lowest density found on the First Floor.

DISCUSSION

From the questionnaire data collection, several aspects were evaluated by the respondents. The findings show that, in terms of spatial arrangement, a high percentage of employees agree that having enough work space with good circulation, arrangement, and a more private layout will positively affect them and improve their well-being. In terms of furniture, a high percentage of employees agree that the workspace needs to provide a comfortable and ergonomic workspace. However, they perceive that this will not have a high impact on their work productivity. While in terms of noise, it has been found that employees have an equal percentage of opinion that noise affects their work

performance, but most of them prefer a quiet ambience with a noise barrier workspace. In terms of lighting, a high percentage of employees agree that the workspace needs to provide a sufficient amount of lighting, as it promotes comfort, and inadequate lighting can affect work performance. While in terms of preference, the findings show a high percentage of employee agree that humidity (fresh air) and the presence of greeneries (interior plants) either directly or indirectly within the workspace area will help them to keep focus, feel active and fresh, have a restorative effect, which has an impact on the comfort level and their productivity.

Upon observation, it was found that all three firms implemented a combination office layout, as this layout offers a combination of multifunctional spaces with cellular offices. The office plan layout supports this result, as each of the firms compartmentalises the areas differently: lounge area, workstation, director's room, meeting area, pantry, and surau. A combination office layout aims to encourage communication and discussion among employees by providing connectivity, as proven by the findings of Space Syntax simulation. In the workstation area, high-density circulation was observed in the open-plan office layout, whereas low-density circulation occurred in the partitioned office layout. However, an open-plan layout offers more connectivity among employees, while a partitioned office layout provides a quieter and more private environment. This combination type of office layout is an efficient approach to creating a health-inducing environment through enhanced communication among employees, while also providing a workspace with greater privacy from noise and visual distractions.

Findings from the questionnaire, observation, and Space Syntax analysis show a clear correlation between spatial layout and employee well-being. A combination office layout balancing open and partitioned spaces supports both connectivity and privacy. Adequate space, comfort, lighting, and noise control enhance well-being and focus, indicating that balanced spatial and environmental design indirectly improves work performance.

CONCLUSION

This study found that environmental factors, including spatial arrangement, furniture, noise, lighting, and greenery elements, influence employees' psychological well-being and productivity. Adequate space for movement and storage, comfortable workstations, and sufficient personal space, especially for large-format tasks, were linked to higher work productivity. Adequate lighting and availability of fresh air were also valued for enhancing comfort, efficiency, and performance. Meanwhile, a combination office layout suits the aim of creating connectivity while also providing privacy, emphasising the importance of health-inducing environments in architectural firms.

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