Impact of Indoor Environmental Quality (IEQ) on Academic Building to Psychology and Social of Students

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Abstract

Higher Education Institutions (HEIs) is one of the places to develop human capital development country. The conducive environment is required in order to determine the productivity and quality of the students and academic their performances. Indoor Environmental Quality (IEQ) in the Teaching and Learning (T&L) process can give impact on social psychology and students indirectly. IEQ elements are such as lighting, sound intensity, Indoor Air Quality (IAQ) and thermal comfort. Good IEQ is required to ensure the psychological and social impact on the negative side can be reduced which IEQ have to be improved. The scopes of studies are involving all the Public Higher Education Institutions (HEIs) in Malaysia. This investigation has been carried out by the survey method. A number of 500 respondents from 500,000 populations have been selected from 20 Public HEI. The questionnaires are including the psychology and social impact for IEQ condition. It can seen that the IEQ have some impact on the psychology and social of the students when they are in academic building. Some suggestion has been carried out to improve the IEQ in academic building. The collected data has been analyzed by using the Statistical Package for Social Science (SPSS). It can be concluded that, this research has providing a better understanding about IEQ in psychology and social. Additionally, this finding can be applied as a reference in the future for facility and property management and public in sustaining and optimizing the IEQ.

Key word: Building performance, Indoor Environmental Quality, Psychology and Social impact, Academic Building
Background

Indoor Environmental Quality (IEQ) is rarely considered as a priority in the building development planning and management. In Malaysia, IEQ elements cover 21% of green building evaluation criteria for non-residential building such as academic buildings in higher education intuitions (HEI) [1]. An imbalance of IEQ offers negative impact to facilities, building and occupants. The imbalance of IEQ was contributes to the health quality of occupant and also the case of academic building affected the teaching and learning process [2]. Moreover, this imbalance will contribute for Sick Building Syndrome (SBS), which bring a broad definition that includes a variety of symptoms considered to be experienced when the occupants spent time in a particular building. This problem also affected the psychology and social of user when the surrounding it not in the conducive environment. Based on the previous research, a building will be categorized as a sick building when more than 30% occupants have complained of related symptoms [3]. The normal person spent 90% the time in their life in the building either in workplace or home, both indoor environmental (IEQ) of home or workplace are equal importance in human health, psychology and social [5]. Most the previous study have focused on the workplace and residential without taking into account about the priority of HEIs [4]. IEQ are mainly focus on thermal temperature (°C), relative humidity (%), acoustic comfort measured in decibel (dB), lighting measured in lux level (lux) and Indoor Air Quality (IAQ), (CO₂ concentration level and air speed movement) [6].

Objectives/Research Questions

The main objective of this research is to identify user’s perception of IEQ on the academic building. Scope for this study is to focus on 20 Public HEIs. This study is important as it will reflect the quality of health, psychology and social effect of building occupants which may directly give impact to teaching and learning.

Research Methodology

The questionnaire has been developed based on research objectives to obtain feedback from the respondents. The questionnaire was distributed to 500 respondents which were selected randomly from 500,000 population of 20 public higher education intuitions in
Malaysia. The data then were analyzed using quantitative methods. A program *Statistical Package for Social Science (SPSS)* was used in the process of analysis of the data.

**Findings**

1. **Opinion of IEQ affected the Teaching and Learning Process (T&L).**

Respondent was asked about their opinion of IEQ affected the Teaching and Learning Process (T&L). The result shows the percentage of respondents’ view of how IEQ affects the teaching and learning process (T&L). 81% or 413 respondents from 500 respondents said Yes, while 13% or 64% of the respondents indicated no effect, and the remaining 33 respondents, or 6% said not sure. Some expressed the opinion that the IEQ certainly have an impact on T&L activities. Undoubtedly it have a profound impact because T & L is the core business of a HEI will disturbed.

1.1 **Examples of IEQ effects on T&L**

From the respondents indicated Yes. They were asked to state what effect they interfere when T&L running. The result shows examples of the effects of IEQ. The majority of respondents who said 191 of the 413 comfortable atmospheres make the respondents become easily sleepy. In addition, 120 respondents felt it would cause not focus when the lecturers deliver the lectures. 75 respondents felt bad lighting make the vision shown to display limited. And the remaining state the bad level of IEQ can make the student’s mood become dispirited.

2. **Opinion of IEQ affected to the health and psychology**

Respondents were asked about their opinion of how IEQ affected to their health, and psychology. The result shows the percentage of respondent’s view of how IEQ affects their health. 65% or 328 respondents stated IEQ do affects health, 27% or 134 respondents expressed no effect and the remaining 8% or 38 respondents stated not sure. The bulk of these IEQ state levels have a direct impact on the health of the consumer academic building.

2.1 **Examples of IEQ Affected on Health and Psychology**
From the respondents indicated yes, they were asked to state what the IEQ affected their health and psychology. 171 of 328 respondents gave an example by stating that the main effects are fever, flu and cough. This is due to the level of air quality that do allow the spread of the flu virus to attack users. 65 respondents stated caused red sore and aching, 29 respondents expressed discomfort body, 25 respondents expressed skin peeling and 38 respondents expressed easily become short of breath. What can be seen, these examples will make a person unable to pay attention and had to leave the class and lead the process of seeking knowledge stunted. Almost all the respondents agreed that the IEQ has affected the psychology of occupant in the academic building.

Discussions

Concentration and alertness is vital for a good performance however there are another several factors that can be interrupt depending on the physical and mental health of an individual. Generally productivity is all about speed and accuracy for certain task but specifically it actually can be measured or subjectively estimated. Personal, social, organizational and environment are the core elements that can affect the output efficiency in the building especially in T&L process. Element of IAQ is the major contribution factor in determine IEQ level. This is because there are several of pollutant gaseous concentrations which is the main of indoor environment pollutants. Poor IAQ can cause the building occupants experience health effects such as flu like symptoms, dermatitis, irritation, systemic toxicity, headache, fatigue, chest tightness which will effect the efficiency and productivity of the occupant. Light can influenced the building occupants’ comfort level in several ways through vision and very important towards the productivity. Poor quality in lighting can effected fatigue, drowsy, nausea, and eye irritation. Poor lighting occurs due to the excessive lighting or inadequate of lights. Besides that Noise and vibration is in a wave motion that can be annoyed in terms of psychological and it can come from outdoor, engineering services or from person to person itself. Noise pollution can create stressful feeling and health effect such as dizziness.

Recommendations

Further to this research, it had shown that the perception of the main user of academic building in public higher education intuitions (HEIs) about the IEQ affected for their
Psychology and social. A few actions should be taken into consideration to produce a good IEQ environment in the academic building in HEIs. The most important is to improve on maintenance of the building. Poor maintenance will affect the building’s environment quality and it highly influences productivity and well being of the facility management. They should give priority on the maintenances aspect as this will affect the core business of university. Other action should be taken are to improve class layout and implement the green technology. This study provides a useful suggestion based on responses for facility management to take decision to improve it. Facility management is responsible in providing an atmosphere in which it will creates conducive environmental in the buildings should be taken into account of the views and suggestions from users. IEQ give big effects on consumers as well as the main uses, and facility management should never take this case for granted.

References