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Indoor Environmental Regulation through Preference and Behaviour of Inhabitants in Houses

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Abstract

Regulating the indoor environment for comfort and energy savings requires appropriate attitude and human behaviour of the house inhabitants. The aim of this study is to identify people's main concerns when building or choosing a home. The research intends to determine how human behaviour regulates the indoor environmental conditions in houses towards achieving comfort and energy savings. A questionnaire survey was conducted through convenient sampling method with approximately 125 respondents. The results indicated the preferences for comfort and inhabitants' attitude and behaviour in regulating the indoor environment.

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Keywords: Human behaviour; comfort; energy savings; house

1. Introduction

'Baiti Jannati', 'Rumahku Syurgaku' or 'My home, My heaven' is a concept that has been propagated in Malaysia since 1992 for inhabitants to regard the home as a place of refuge. As a reflection of heaven, a place of refuge, should accommodate the needs of human behaviour and provide comfort. This concept has been adopted by many agencies, be it government agencies, developers, private companies and sole proprietors. The focus of these agencies are mainly on social conditions; i.e. by recommendations on the

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number of rooms and size of spaces. In line with this concept, Tenaga Nasional Berhad (TNB) as an electric utility has extended assistance through Baiti Jannati Program to assist the poor to own comfortable homes with basic amenities since 2008. The involvement of TNB on this matter has include sustainability issues and involved energy use in buildings. An important issue to maintain comfort in the home is the cost factor that has a major portion contributed to the energy sector. Residential sector in Malaysia has been recorded to emit 2,347,538 tonne of CO₂ and projected to increase up to 11,689,308 by 2020. Therefore, the importance of energy in assisting the provision of comfort is undeniable in these days, especially in the urban area due to the given environmental conditions. Due to the heat island effect in the urban areas, cooling of the indoor spaces, especially in houses has become a prevailing issue. The idea is to achieve comfort with minimal use of energy in the houses. The tendency and inclination to rely on air-conditioning effect the energy demand and emissions of CO₂. The cooling needs and reliance on the air-conditioning has exacerbate rather than mitigate climate change.

Hence, a home should be designed in view of energy efficiency that relies mainly on attitude and behaviour of the inhabitants. It is important to gauge the attitude of house inhabitants in regulating the indoor environment. What are the attitude of the house inhabitants towards energy efficiency? How do they control the indoor environment to achieve comfort? What are the steps taken? What are the preferences of inhabitants in achieving comfort? What affects their choices in achieving thermal comfort? What are the influencing factors? These questions are inevitable to understand how the above concept of Baiti Jannati can be realised and the determine the attitude and behaviour of the house inhabitants. Appropriate human behavior of the inhabitants are integral in regulating the indoor environment to achieve comfort and energy savings. This research intend to answer the questions posed in order to understand and suggest appropriate indoor environment that suits the attitude and behaviour of house inhabitants. In short, a house should be a place of refuge that support the need of human comfort and behavior, and, in turn the inhabitants have the ability to regulate their indoor environment.

2. Literature Review

This research looks into issues of respondents' preferences, attitude and behaviour to achieve comfort in houses. The literature review indicate the area of focus for this research. The focus area encompasses human attitude and behavior, comfort and expectations in houses.

Human behaviour is the anticipated as the main factor that governs the quest for comfort in the houses. Many researches have been conducted to determine how human behaviour has influenced different sectors of energy savings of both commercial and residential building (Bell et al.,1996; Wilk, 1999; Lutzenhiser, 1993). Ibrahim and Noor Hanita (2014) have forwarded that major issues in households energy use are: architectural (design) issue, appliances/services (technology) efficiency issue and the human (behavioural) issue. The study done in Nigeria focused on the said issues to determine the factors that effects energy efficiency on pre-determined housing samples. The survey questionnaire are also accompanied with interviews with the inhabitants to gauge their experiences and behaviour in the houses. The results of the study indicated that there are strong correlation between attitude and behaviour to energy efficiency in the houses. It is interesting to note that the study found that age and level of education of the respondents are the influncing factors towards the occupants attitude to energy savings. In addition, Diez-Nicholas (2006) forwarded that preceding human behaviour is the attitude factor. According to him, attitude preceded behaviour and propagated that it as instrumental collective responses of the population to achieve the best adaptation possible to their environment. Factors such as education/awareness and social status may have implication on energy efficiency awareness but not necessarily determine it (Abdul Majid and Hussaini, 2011).

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