

UNIVERSITI TEKNOLOGI MARA

**THERMAL COMFORT IN AIR-CONDITIONED LEARNING
ENVIRONMENT**

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Abstract

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This paper evaluates the current thermal comfort conditions of air-conditioned learning environment and health effects among the occupants using objective measurement and subjective assessment. Objective measurement was mainly to quantify the air temperature, mean radiant temperature, relative humidity and air velocity. Subjective assessment was conducted using a questionnaire to determine the occupants thermal comfort sensations and investigate their perception of the thermal comfort level together with their comments on health effects. It was found that the measured relative humidity and air velocities were within the limits of recommended standard although operative temperatures were below the proposed limit. In general, thermal comfort in the air-conditioned learning environment was within acceptable level with 53.2% of the occupants vote in comfortable segment. The calculated Prediction Mean Vote (PMV) – Predicted Percentage Dissatisfied (PPD) indices computed only 14.35% of the occupants were not satisfied with the learning environment. Nevertheless, the calculated Thermal Sensation Vote (TSV) revealed that the people perceived the learning environment to be slightly cool as well as 44.7% from them were slightly uncomfortable. Furthermore, there was significant difference ($p < 0.05$) between value of thermal comfort based on PMV and value of thermal comfort based on comfort vote (TSV). Results also showed that there was significant association between learning environment and health effects among the occupants. Additionally, recommendations were made to improve the thermal comfort condition of the air-conditioned learning environment as well to advance the health condition among the occupants.

Keywords: Thermal comfort, PMV-PPD, TSV, health effects

CHAPTER I

INTRODUCTION

1.1 General Overview

Healthy and comfortable climate conditions are essential for any type of environment but, in particular, university campus are a category of buildings in which a high level of environmental quality may considerably improve occupants' attention, concentration, learning, hearing and performances (Croome, 2001). Thermal comfort is an important aspect in the establishment of comfort in a building. In Malaysia, education systems are very imperative and sometimes encountered transitions in the recent years. Many new buildings are being constructed or renovated in the programs of expansion of the campus. It also includes the installation of air conditioner, windows, wall, and ventilation systems and others in those buildings in the way to provide thermal comfortable condition in classrooms, and the campus. Due to that condition, the comfort level of such new building may not well discovered and need to be assessed in order to fulfill the requirements for learning environments.

The decisive aim of conditioning the interior environments of buildings is to provide a comfortable and healthy indoor environment for the occupants. There is increasing concern over the quality of the indoor environment as the standard of living improves in society. This is of paramount importance for buildings in the tropics where air-conditioning of the indoor environment is not uncommon. In many instances, failure to provide satisfactory thermal conditions has resulted in discomfort and ill health. As such, there has been a constant need to study the thermal conditions of these indoor environments.