CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter mainly emphasizes on the general idea of this study along with the problem statements, objectives, significance of study and the scope of study.

1.2 BACKGROUND OF STUDY

Temperature can be defined as average kinetic energy in a body (Parsons, 2003). Generally, indoor temperature is one of the fundamental characteristics of the indoor environment. The indoor temperature can affect the human response, such as thermal comfort, performance at work, perceived air quality and sick building syndrome symptoms (Seppänen, Fisk, & Lei, 2006).

According to ASHRAE (2009), thermal comfort was defined as psychological state of expressing satisfaction towards surrounding thermal environment. Every human has their own thermal sensation based on their physiological and psychological state. There are two different approaches to determine the thermal comfort, but the most common approach is Fanger’s Predicted Mean Vote (PMV). Seven points ASHRAE thermal sensation scale is used in the PMV model. The thermal comfort condition is where at least 80% of the occupants are satisfied.

There are many studies over the years on the relationship between the temperature and the task performance. In the study of (Seppänen et al., 2006), they showed a positive influence of temperature on the task performance. The task performance can be included
as text processing, simple mathematics equation and writing-based task. Same goes to the study of Cui et al. (2013), they proved that temperature influences the task performance greatly. The optimum temperature for efficient task performance is 25.8 °C.

1.3 PROBLEM STATEMENT

Temperature is an ergonomic factors, which if not controlled properly, can negatively affected the human physical condition and performance rate (US Department of Labor, 2000)

Based on the study of Tham & Willem (2010), it shows that by increasing the temperature and relative humidity, it will significantly decreased tear film quality and the concentration of salivary alpha-amylase. All these physiological conditions indicating that lower mental arousal and alertness. Thus, high temperature will lower task performance.

As mentioned on above, extreme temperature can affect physiologically. Lan et al. (2011) had conducted a research on 12 subjects and investigated the effect of thermal environment on health problem. The result shows that the respondent’s heart rate, respiratory ventilation, and end-tidal partial pressure of carbon dioxide increased significantly and their arterial oxygen saturation decreased. The results implied that the temperature brings negative effects on health when people feel thermally warm or discomfort.

Extreme temperature will causes thermal discomfort and people are more easily to get distracted and lost motivation. Cui et al. (2013) had conducted an experiment to study the effect of temperature on thermal comfort, motivation and task performance. It has been proven in this study that the learning effect was greatly affected by temperature. Changes on task performance rate is not only influenced by the environment factor, temperature, but also the subjective factor, motivation. Motivation is improved when the surrounding temperature is comfortable to them. Eventually, as motivation level increases, the task performance rate increases as well.
1.4 CONCEPTUAL FRAMEWORK

![Conceptual Framework Diagram](image-url)

**Figure 1.1** Conceptual Framework

*Keys:*
- Study variables
- Variables