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**THE INFLUENCE OF BIOPHILIC  
DESIGN TOWARDS STUDENT'S  
LEARNING  
ABILITY IN UNIVERSITY LIBRARY  
ENVIRONMENT**

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## ABSTRACT

Libraries provide students with numerous resources, technology, devices, and spaces to enhance their learning experience. A sustainable environmental design library might not only enhance students' quality of life and academic performance, but also their learning abilities. Some settings, including offices, hospitals, and primary schools, have considerable study on the influence of environmental design on people's abilities, whereas urban post-secondary educational environments have limited resources. For this reason, this research examines biophilic design as a way to improve student learning ability in a university library. The study investigates the design strategies, through a simulation experiment for before and after applying biophilic design using virtual reality (VR) and wearable bio monitoring sensors were used to measure blood pressure and heart rate. Learning ability tests were administered before and after towards 8 patterns from 14 pattern of biophilic design that have been selected from three university, which have been adopted 8 pattern of biophilic design. The indoor biophilic environment was associated with a decrease in participants' blood pressure and heart rate after applying biophilic design. Moreover, students in biophilic environments unanimously agreed that the circumstances of biophilic design contributed to their improved learning ability when compared to students in non-biophilic environments. Based on the statistical analysis, the result pre and post t-test at .05 level of significance for heart rate and blood pressure, we found that exposure to a biophilic indoor environment has calming effects as seen in the changes to blood pressure as well as positive impact on student heart rate. The results revealed a wide range of benefits, from the improvement of the learning environment to the promotion of pro-environmental behaviour toward learning ability.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Research Background

Learning ability has described as the act of changing an individual's knowledge and behaviour skills (Othman et al., 2016). Studies show that students who study in a pleasant atmosphere are more motivated, engaged, and have a higher overall learning capacity (Wan & Wong, 2015). In this aspect, students' abilities may generate possibilities in university libraries that have accommodated changes in usage patterns to assist better students in learning ability and intellectual pursuit (Kim, 2017), allowing them to enhance their roles in the academic community. It also shows that university libraries are frequently overcrowded and underutilized (Hall & Kapa, 2015). Therefore, when students cannot find a quiet place to study, student operate less effectively than in a less congested setting (Dong et al., 2017). Thus, an improved library interior and constructed environment should offer greater comfort and educational benefits (Baba & Affendi, 2020).

The growth of library concepts should be evolutionary, with new design and functionality developing as student needs change. The significant elements of a library's interior include lighting, furniture, materials, and finishes (Sufar et al., 2012). Thus, a biophilic design is applied to create sustainable architecture (McGee & Marshall-Baker, 2015). Biophilic design is "a deliberate attempt to convert knowledge of the innate human affinity to affiliate with natural systems and processes known as "biophilic into physical form," says researcher (Stephen R. Kellert, 2018). For example, a garden view may inspire creativity, while a shadow or height may inspire anxiety, and animal companionship and a walk in the park may be soothing and therapeutic (Browning, 2018).

The word biophilic design is used today to describe a design strategy that incorporates nature connections, many encounters and experiences with the natural world, and human senses, emotions, intellect, and even culture into nature (McGee & Marshall-Baker, 2015). Our physical and mental health, productivity, and well-being are all dependent on our connection with the environment (Calabrese & Dommert, 2018). Thus, studies have linked biophilic design with mental fatigue, stress recovery,