



ORIGINAL ARTICLE

Enhancing Social Activity Through Climate-Adaptive Design in Hot-Humid Campus Open-Spaces: A Case Study of the University of Basrah in Iraq

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ABSTRACT

Outdoor open spaces between university buildings support students' community interactions and academic achievements. However, in hot-humid climate zones, some of these spaces lack activity and experience social withdrawal due to thermal discomfort. This is seen on the University of Basrah campus. To address this, the study aimed to identify the most suitable climate-adaptive design pattern to improve thermal comfort and, in turn, enhance students' social presence in the University of Basrah's neglected, peripheral outdoor campus spaces. A convergent mixed-method case study was applied. First, measurable environmental and social factors were identified from related studies. Next, two open spaces in the Faculty of Engineering were assessed through 389 valid student questionnaires, behavioural observations, and Envi-met simulations to identify the weaker space. Then, using the same software, six scenarios—comprising two tree species and three shading structure patterns—were proposed to improve students' thermal comfort. The results showed that Model 6 (hybrid pattern of timber-louvered canopies and *Albizia Julibrissin* trees) yielded the lowest predicted mean vote (PMV) of 0.8–2.46 and lowered the mean radiant temperature (T_{mrt}) by 5.56°C. It also reduced the sky view factor (SVF) and promoted natural ventilation. These findings demonstrate that integrating tree species and shading structures optimised thermal comfort, which in turn is expected to enhance social presence, confirming the value of urban design informed by thermal and environmental data for the sustainability of public spaces.

Keywords: Thermal comfort, Campus open spaces, Social performance, Environmental performance, Climate-adaptive design, Education buildings, Basrah

1. Introduction

Outdoor open spaces between university buildings are a vital fabric to support community interactions [1]. These interactions are essential in developing students' society, creating vibrant campuses, which in turn, support their academic achievements [1–3]. Previous studies have focused on improving thermal comfort in open spaces as a core design goal [4–6]. Research concludes that using high-density leafy

trees assists in improving user comfort and outdoor spaces usage in China [7], in addition to reducing air temperature and average radiation in Malaysia [8], where both have hot-humid climates. These studies, using mixed methods (ENVI-met program, field measurements, and a questionnaire), demonstrate that afforestation reduces thermal stress. Conversely, it is found that high sky view factor (SVF > 0.8) correlates with reduced thermal comfort in Assiut University campus in Egypt [9], while tree shading reduces the

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