THERMAL COMFORT AND USERS' SATISFACTION IN THE DESIGN OF AN INDOOR SPORTS FACILITY FOR COVENANT UNIVERSITY, OTA

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A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE (M.Sc.) IN ARCHITECTURE OF THE DEPARTMENT OF ARCHITECTURE, COLLEGE OF SCIENCE AND TECHNOLOGY, COVENANT UNIVERSITY OTA, OGUN STATE, NIGERIA

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DECLARATION

I, YAMAH, DANIEL OLUGBENGA (20PCA02162) of the Department of Architecture, Covenant University, Ota, Ogun State, declare the information contained in this dissertation work is the result of honest academic research undertaken by me. I attest that the dissertation has not been presented wholly or partially for the award of any degree elsewhere. All sources of data scholarly dissertation information used in this dissertation are duly acknowledged.

YAMAH, DANIEL OLUGBENGA

Signature and Date

ACCEPTANCE

This is to attest that this dissertation carried out by **YAMAH, DANIEL OLUGBENGA** has met the required standard for the award of the degree of Master of Science (M.Sc.) in Architecture and has been accepted by the school of Postgraduate Studies, Covenant University, Ota, Ogun State.

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(Secretary, School of Postgraduate Studies) **Signature and Date**

Prof. Akan B. Williams
(Dean, School of Postgraduate Studies) **Signature and Date**

CERTIFICATION

We certify that this dissertation titled **"THERMAL COMFORT AND USERS' SATISFACTION IN THE DESIGN OF AN INDOOR SPORTS FACILITY FOR COVENANT UNIVERSITY, OTA"** is an original research work carried out by **YAMAH, DANIEL OLUGBENGA (20PCA02162)** in the Department of Architecture, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria, under the supervision of Dr A.O. Owoseni.

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DEDICATION

This research work is dedicated to the Almighty God and my wonderful parents, Rev. Canon and Mrs I.K Yamah, who are my benefactors and stakeholders. Also, academics and professionals who in their everyday pursuits are looking for methods to promote the cause of architecture for human sustainability.

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LIST OF ABBREVIATIONS

IAQ - Indoor Air Quality

IEQ - Indoor Environment Quality

PCM - Personal Comfort Model

PMV - Predicted Mean Vote

PPD - Predicted Percentage Dissatisfied

HVAC - Heating, Ventilation, and Air Conditioning

MET - Metabolic Equivalent of Task

CLO - Clothes Thermal Insulation Value

RH - Relative Humidity

PCS - Personal comfort systems

ASHRAE - American Society of Heating, Refrigerating, and Air-Conditioning Engineers

ANSI - American National Standards Institute

ABSTRACT

This study evaluates thermal comfort and user satisfaction in the design of an indoor sports facility for Covenant University, Ota, Nigeria. Indoor sports facilities are considered the most popular because they offer various benefits over outdoor sports facilities. They are relatively independent of weather conditions. It is easier to provide users with quality thermal conditions because of the air-tightness of the buildings and the opportunity to use various modern and complex technical equipment. In recent years, ensuring comfort in interior spaces has become a substantial responsibility requiring the collaboration of several professionals. However, the features that assure comfort and the measures that enhance the nature of the indoor spaces are frequently investigated independently. This study aimed to evaluate the influence of thermal comfort in selected indoor sports facilities in Southwest Nigeria in order to design an indoor sports facility for Covenant University, Ota, to ensure users' satisfaction. A review of relevant literature identified existing standards for adequate thermal comfort in various indoor spaces, highlighting the components that influence thermal comfort in buildings designs in relation to indoor sports facilities. The research methodology employed for this research work was focused on the outlined research objectives. A mixed research design was adopted which was quantitative and qualitative methodology, and case studies were executed on existing indoor sports facilities with empha sis on existing thermal comfort components and their present status. Questionnaires were also administered to users of the various indoor sports facility to evaluate their satisfaction with the indoor sports facility available and their level of thermal comfort satisfaction experienced in the facilities. An observation guide was used to evaluate the thermal comfort components present in each of the facilities and their current state. When compared to international norms, the findings of this study suggest that thermal comfort components to ensure user happiness in indigenous indoor sports facilities are fairly adequate. It is suggested that the proposed energy-rated indoor sports facility considers essential components of thermal comfort and characteristics that assure users' satisfaction from the commencement of the building design, taking into account the users' demands. This study concludes that thermal comfort is achievable even in indoor sports facilities and by appropriately regulating indoor thermal comfort, performance and productivity will probably increase, as well as the welfare and satisfaction of the indoor sports facility's users.

Keywords: Thermal Comfort, Indoor Sports Facility, Indoor Environment Quality, Building Energy Rating, Satisfaction, Users