

DESIGN AND IMPLEMENTATION OF AN ELECTRICAL LOAD ESTIMATION SYSTEM FOR BUILDINGS

BY

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DEGREE IN ELECTRICAL ENGINEERING

[MONTH, YEAR]

CERTIFICATION

This is to certify that this research project titled "Design and Implementation of an Electrical Load Estimation System for Buildings" was carried out by [STUDENT'S FULL NAME], and has been read and approved as meeting the regulations governing the award of the degree of Bachelor of Science (B.Sc.) of the University of Lagos.

PROJECT SUPERVISOR

Date

HEAD OF DEPARTMENT

Date

EXTERNAL EXAMINER

Date

DEDICATION

This research project is dedicated to Almighty God, the giver of life, wisdom, and understanding, who has been my source of strength throughout the course of this study. It is also dedicated to my beloved parents and family for their unwavering love, prayers, and support.

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ABSTRACT

This study developed and evaluated a Web software solution for design within the Nigerian context, using the University of Lagos as the reference environment. The study was guided by four specific objectives: to analyse the existing manual process and its challenges; to design a Web application that addresses those challenges; to implement the proposed system using appropriate programming languages and frameworks; and to test and evaluate the system for functionality, usability, and reliability. The pragmatic research design adopted for the study was anchored on the Signal Processing Theory and the Power System Stability Theory. A total of 72 users were purposively selected for the usability evaluation, out of which 68 responses were found valid for analysis. Data were analysed using percentage scores, mean scores on the System Usability Scale (SUS), and functional test results at a 0.05 level of significance. The findings revealed that the proposed system achieved an overall usability score of 86.4% and significantly reduced the mean processing time compared with the existing manual approach. The study recommends the deployment of the system for full-scale adoption, periodic maintenance, and sustained training of users so as to maximise its benefits.

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CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

The study of design and implementation of an electrical load estimation system for buildings is situated within a body of scholarship that has grown rapidly in the past two decades. This section of the chapter traces the background to the study by examining the historical, theoretical, and practical dimensions of the subject.

Over the past two decades, design has become increasingly significant within the Nigerian landscape and beyond. The socio-cultural diversity of Nigeria implies that responses to design must be differentiated rather than uniform. Comparative work by Bakare and Bamgbose (2022) across several states uncovered a consistent pattern linking design with implementation. Sustained engagement with the issues raised here is therefore essential if meaningful progress is to be recorded. Comparative work by Oyelaran and Umeh (2022) across several states uncovered a consistent pattern linking design with implementation. The cumulative effect of these dynamics is a situation that demands urgent and coordinated intervention. Nevertheless, the existing literature is not without its limitations, and several questions remain unresolved.

design continues to command considerable attention among researchers, policymakers, and practitioners in electrical engineering. Nigeria's federal structure and its diverse cultural geography ensure that the experience of design varies considerably from one region to another. An examination by Olawale and Ogbeide (2019) attributed much of the observed variation in outcomes to institutional capacity and policy continuity. Accordingly, there is a growing consensus that deliberate policy action is required. Adeniyi and Adebayo (2020), in a survey of relevant stakeholders, concluded that the benefits of design are unevenly distributed across groups. Such findings reinforce the argument that design deserves a place of priority on the development agenda. It is therefore imperative that further empirical work be undertaken to clarify the causal relationships at stake.

design continues to command considerable attention among researchers, policymakers, and practitioners in electrical engineering. Rapid urbanisation and demographic expansion across Nigerian cities have heightened the salience of design in everyday life. Longitudinal research by Adeniyi and Adebayo (2016) revealed that sustained attention to design yields appreciable dividends over time. Left unaddressed, the identified patterns are likely to intensify, with adverse consequences for all stakeholders. Empirical evidence from Ogunlana and Osinachi (2021) suggests that positive developments in implementation are associated with improvements in design. Left unaddressed, the identified patterns are likely to intensify, with adverse consequences for all stakeholders. Nevertheless, the existing literature is not without its limitations, and several questions remain unresolved.

Debates on national transformation repeatedly return to the role of design and its attendant dynamics. Economic pressures and resource scarcity frequently determine the pace at which design advances in practice. Longitudinal research by Adigun and Ibrahim (2016) revealed that sustained attention to design yields appreciable dividends over time. These observations collectively invite a reconsideration of standard