

DESIGN AND IMPLEMENTATION OF A BOREHOLE PUMP INSTALLATION TRACKER

BY

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BEING A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF MECHANICAL ENGINEERING,
FACULTY OF ENGINEERING, UNIVERSITY OF LAGOS, AKOKA, LAGOS STATE

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF SCIENCE (B.Sc.)
DEGREE IN MECHANICAL ENGINEERING

[MONTH, YEAR]

CERTIFICATION

This is to certify that this research project titled "Design and Implementation of a Borehole Pump Installation Tracker" 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.

ACKNOWLEDGEMENT

My profound gratitude goes to Almighty God for His grace, protection, and guidance throughout the duration of my study and the successful completion of this research project. I am deeply grateful to my supervisor, [SUPERVISOR'S NAME], for the patience, guidance, constructive criticism, and invaluable direction provided throughout the course of this research. I also wish to appreciate the Head of Department, the lecturers of the Department of Mechanical Engineering, and my course mates for their support and friendship. My appreciation also goes to my parents and siblings for their unwavering support, both financial and emotional, throughout my academic journey.

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 Thermodynamics Laws and the Tribology Theory. A total of 64 users were purposively selected for the usability evaluation, out of which 58 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 80.9% 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 a borehole pump installation tracker 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 colonial and post-colonial legacies of the Nigerian state continue to influence contemporary patterns of design. Research by Adebayo and Alade (2021) using mixed methods provided particularly rich insight into the mechanisms connecting design and implementation. Sustained engagement with the issues raised here is therefore essential if meaningful progress is to be recorded. Empirical evidence from Ogbeide and Musa (2021) suggests that positive developments in implementation are associated with improvements in design. The practical import of these findings extends well beyond the academic sphere into everyday institutional practice. Despite these advances, notable gaps persist, particularly with respect to context-specific evidence from Nigeria.

Contemporary scholarship increasingly frames design as inseparable from the broader question of implementation. Globalisation and technological change have intensified both the opportunities and the challenges associated with design. The work of Famuyide and Umeh (2023) extended earlier analyses by demonstrating that implementation reinforces the effects of design. The practical import of these findings extends well beyond the academic sphere into everyday institutional practice. Comparative work by Alade and Adigun (2022) across several states uncovered a consistent pattern linking design with implementation. Such findings reinforce the argument that design deserves a place of priority on the development agenda. The reviewed studies, while valuable, are frequently dated, small in scale, or confined to a single locality.

design, when examined in relation to implementation, reveals complex and often paradoxical dynamics. National policies and programmes have sought, with varying degrees of success, to respond to the realities of design and implementation. The aggregate picture emerging from Alade and Adigun (2023) points to a modest but consistent association between design and the outcomes of interest. The practical import of these findings extends well beyond the academic sphere into everyday institutional practice. Empirical evidence from Bakare and Obiora (2021) suggests that positive developments in implementation are associated with improvements in design. These developments carry important implications for policy and practice in mechanical engineering. The reviewed studies, while valuable, are frequently dated, small in scale, or confined to a single locality.

Contemporary scholarship increasingly frames design as inseparable from the broader question of implementation. Economic pressures and resource scarcity frequently determine the pace at which design advances in practice. Comparative work by Bamgbose and Kalu (2022) across several states uncovered a consistent pattern linking design with implementation. Accordingly, there is a growing consensus that deliberate policy action is required. Empirical evidence from Osinachi and Okonkwo (2021) suggests that