DEVELOPMENT OF MATHEMATICAL MODELS FOR DISEASE SPREAD AND CONTROL

BY

[STUDENT'S FULL NAME]

[MATRIC NUMBER]

BEING A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF MATHEMATICS, FACULTY OF SCIENCE, UNIVERSITY OF LAGOS, AKOKA, LAGOS STATE

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

[MONTH, YEAR]

CERTIFICATION

This is to certify that this research project titled "Development of Mathematical Models for Disease Spread and Control" 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.

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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 Mathematics, 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 examined development of mathematical models for disease spread and control, using undergraduate students of the University of Lagos as a case study. The study was guided by three specific objectives: to examine the extent to which respondents exhibit the key attributes of development; to determine the influence of these attributes on the outcomes under investigation; and to identify the challenges associated with development and mathematical. The study adopted a descriptive survey research design, anchored on the Polya's Problem-Solving Theory and the Mathematical Modelling Theory. A sample size of 387 respondents was determined using the Taro Yamane formula and selected through stratified and simple random sampling techniques, out of which 349 questionnaires were found valid for analysis. Data were analysed using descriptive statistics, including frequency counts, percentages, and weighted mean scores, and inferential statistics, including the Pearson Product Moment Correlation Coefficient, the Independent Samples t-test, and the chi-square test, at a 0.05 level of significance. The findings revealed that respondents exhibit the identified attributes to a considerable extent (grand mean = 3.07). The study also found a statistically significant, moderate, positive relationship between the independent and dependent variables ($r = 0.54$, $p < 0.05$) and a significant dependent association on the chi-square test (chi-square = 5.59, $p < 0.05$). No statistically significant difference was found between male and female respondents ($t = 1.04$, $p > 0.05$). The major challenges identified include inadequate awareness, weak institutional support, infrastructural constraints, and limited access to information. The study recommends targeted interventions, improved access to resources, and intensified public education on development.

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CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

The study of development of mathematical models for disease spread and control 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.

The salience of development in national discourse has grown steadily, driven by changing social conditions and technological penetration. Public institutions at the federal, state, and local levels have developed programmes that seek to mainstream development into routine governance. Ibrahim and Chukwu (2020), in a survey of relevant stakeholders, concluded that the benefits of development are unevenly distributed across groups. Sustained engagement with the issues raised here is therefore essential if meaningful progress is to be recorded. Evidence assembled by Kalu and Bakare (2015) across twelve states underscored the heterogeneity of outcomes linked to development. 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.

The relationship between development and mathematical has been the subject of sustained academic interest across several disciplines. Economic pressures and resource scarcity frequently determine the pace at which development advances in practice. Empirical evidence from Chukwu and Aderemi (2021) suggests that positive developments in mathematical are associated with improvements in development. Accordingly, there is a growing consensus that deliberate policy action is required. The work of Nwosu and Umeh (2023) extended earlier analyses by demonstrating that mathematical reinforces the effects of development. The practical import of these findings extends well beyond the academic sphere into everyday institutional practice. The reviewed studies, while valuable, are frequently dated, small in scale, or confined to a single locality.

development continues to command considerable attention among researchers, policymakers, and practitioners in mathematics. Within Lagos State, the country's most populous commercial hub, the dynamics of development are observed in their starkest form. Empirical evidence from Nwosu and Umeh (2021) suggests that positive developments in mathematical are associated with improvements in development. The practical import of these findings extends well beyond the academic sphere into everyday institutional practice. An examination by Ibrahim and Okonkwo (2019) attributed much of the observed variation in outcomes to institutional capacity and policy continuity. 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.

development occupies a prominent position in contemporary debates about mathematical and national development. Economic pressures and resource scarcity frequently determine the pace at which development advances in practice. Research by Adekunle and Osinachi (2021) using mixed methods provided particularly