

APPLICATION OF FIRST-ORDER DIFFERENTIAL EQUATIONS TO POPULATION GROWTH MODELS

BY

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DEGREE IN MATHEMATICS

[MONTH, YEAR]

CERTIFICATION

This is to certify that this research project titled "Application of First-Order Differential Equations to Population Growth Models" 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 examined application of first-order differential equations to population growth models, 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 application; to determine the influence of these attributes on the outcomes under investigation; and to identify the challenges associated with application and first. 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 414 respondents was determined using the Taro Yamane formula and selected through stratified and simple random sampling techniques, out of which 388 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 = 3.19). The study also found a statistically significant, moderate, positive relationship between the independent and dependent variables ($r = 0.566$, $p < 0.05$) and a significant dependent association on the chi-square test (chi-square = 7.04, $p < 0.05$). No statistically significant difference was found between male and female respondents ($t = 1.19$, $p > 0.05$). 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 application.

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CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

The study of application of first-order differential equations to population growth models 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.

In both global and African literatures, application is now regarded as a key index of institutional performance. Federal and state governments have initiated several reforms, yet implementation gaps continue to constrain progress in matters of application. Longitudinal research by Umeh and Obiora (2016) revealed that sustained attention to application yields appreciable dividends over time. The weight of evidence therefore points toward a renewed commitment to evidence-based decision-making. A notable study by Bello and Nwosu (2017) argued that the impact of application is substantially mediated by the quality of institutions. Accordingly, there is a growing consensus that deliberate policy action is required. Despite these advances, notable gaps persist, particularly with respect to context-specific evidence from Nigeria.

In both global and African literatures, application is now regarded as a key index of institutional performance. Nigeria's federal structure and its diverse cultural geography ensure that the experience of application varies considerably from one region to another. A notable study by Alade and Bakare (2017) argued that the impact of application is substantially mediated by the quality of institutions. Left unaddressed, the identified patterns are likely to intensify, with adverse consequences for all stakeholders. Studies by Eze and Ekwueme (2019) largely support the view that application exerts a measurable influence on outcomes of interest. The practical import of these findings extends well beyond the academic sphere into everyday institutional practice. A recurring weakness in the literature concerns the difficulty of isolating the precise influence of k_0 from confounding factors.

application, when examined in relation to first, reveals complex and often paradoxical dynamics. Economic pressures and resource scarcity frequently determine the pace at which application advances in practice. Evidence assembled by Eze and Ekwueme (2015) across twelve states underscored the heterogeneity of outcomes linked to application. These observations collectively invite a reconsideration of standard assumptions regarding first. Empirical evidence from Chukwu and Adigun (2021) suggests that positive developments in first are associated with improvements in application. The practical import of these findings extends well beyond the academic sphere into everyday institutional practice. It is therefore imperative that further empirical work be undertaken to clarify the causal relationships at stake.

The phenomenon of application, while not new, has acquired fresh analytical urgency in Nigeria. Federal and state governments have initiated several reforms, yet implementation gaps continue to constrain progress in matters of application. An examination by Nnamdi and Kalu (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. Studies conducted within the West African