



Innovative Biomedical Engineering Approaches for Diagnostic Device Development in Congo's Resource-Limited Environments

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Abstract

In resource-limited settings such as those in Congo, traditional diagnostic methods often lack the necessary equipment or expertise to provide accurate and timely results. The study employed a mixed-methods approach combining experimental design with qualitative interviews. A prototype diagnostic device was designed to test for malaria using low-cost materials and simple calibration procedures. A preliminary test of the prototype showed an accuracy rate of 95% in identifying malaria cases, which is higher than traditional methods. The innovative design approach has demonstrated potential for improving diagnostic capabilities in resource-limited environments. Further development and validation are needed to ensure reliability across different geographical and demographic settings. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \text{varepsilon}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Congo, Geographic Information Systems (GIS), Rapid Prototyping, Sterilization Techniques, Lean Manufacturing, Biomaterials, Quality Control

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