



# Designing User Interfaces for Low-Literacy Populations in Africa: A Comparative Study in Libya

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## Abstract

This study addresses a current research gap in Computer Science concerning Designing User Interfaces for Low-Literacy Populations in Africa in Libya. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured analytical approach was used, integrating formal modelling with domain evidence. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Designing User Interfaces for Low-Literacy Populations in Africa, Libya, Africa, Computer Science, comparative study This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. Model estimation used  $\hat{\theta} = \operatorname{argmin} \{ \theta \} \operatorname{sumiell} ( y_i, f\theta(\xi) ) + \lambda l \operatorname{Vert} \theta r \operatorname{Vert} 2^2$ , with performance evaluated using out-of-sample error.

**Keywords:** *African, Cognitive Load Theory, Human-Computer Interaction, Low-Literacy, Participatory Design, User-Centred Design, Visual Interface Design*

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