© APR 2026 | IRE Journals | Volume 9 Issue 10 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I10-1716574

Development Of a Mobile Application for Digital Health Consultation and Management

ADELOWO OPEYEMI JOSHUA [1] ILEKANACHI BALDWIN CHIZURUM [2] IRORO LEMUEL EROWO[3] OKEGBULE TESTIMONY SHAMMAH[4]
[1,2,3,4]*Department of Information Technology, Babcock University, Ilishan-Remo, Ogun State, Nigeria*

Abstract- ***Access to quality healthcare in many developing countries is hindered by limited infrastructure, shortages of healthcare professionals, and inefficient management systems, resulting in delayed patient care. This study presents the development of "Medicx," a mobile health application designed to bridge the gap between patients and healthcare providers by integrating consultation, laboratory coordination, and pharmacy services into a unified platform. The system adopts a client-server architecture and Agile development methodology to deliver secure telemedicine services and automated appointment scheduling. Experimental evaluation indicates improved accessibility, reduced waiting time, and enhanced user satisfaction.***

Index Terms- ***Agile Methodology, Digital Health, Healthcare Accessibility, Healthcare Management Systems, Mobile Health Application, Telemedicine.***

I. INTRODUCTION

Digital technology continues to transform global healthcare delivery, yet many developing regions, particularly Nigeria, still face barriers such as long travel distances, hospital congestion, and inefficient healthcare systems [1], [9]. Despite the increasing penetration of smartphones, healthcare services remain largely dependent on physical hospital visits, leading to delays and poor patient experience.

Patients often experience inadequate communication and follow up, while healthcare providers struggle with inefficient appointment scheduling and fragmented patient data [15]. As a result, many individuals resort to unreliable online health information or unqualified practitioners.

This study introduces "Medicx," a mobile health application aimed at providing a comprehensive digital healthcare ecosystem. The system integrates doctors, nurses, laboratories, and pharmacies into a single platform, enabling seamless communication and efficient healthcare delivery.

II. LITERATURE REVIEW

Mobile health, also known as mHealth, has evolved significantly over the past two decades, transitioning from simple SMS-based interventions to complex mobile applications supporting telemedicine and remote monitoring [2], [25]. Early implementations focused on patient reminders and data collection, while modern systems emphasize real-time consultation and integrated healthcare delivery.

A major challenge in existing systems is interoperability. Although standards such as Fast Healthcare Interoperability Resources exist, many healthcare systems are not designed to integrate mobile-generated data, resulting in fragmented care delivery [19], [29].

Sustainability is another key issue. Many mHealth initiatives in Africa remain at pilot stages due to infrastructural limitations and lack of financial models for scalability [6], [22]. Furthermore, user engagement plays a critical role in adoption. Studies indicate that systems offering multiple interaction modes, such as video and chat, significantly improve user acceptance [4].

Security and privacy concerns also affect adoption. Patients are often reluctant to share sensitive health data due to fears of data breaches, highlighting the need for robust security mechanisms in digital health platforms [16], [17].

III. SYSTEM DESIGN AND METHODOLOGY

A. Development Methodology

The system was developed using the Agile Software Development Methodology, which supports iterative development and continuous feedback. This approach enabled incremental development of modules such as user registration, appointment scheduling, and laboratory integration.

B. System Requirements

The system is structured into three main components:

- Patient Interface: Allows users to book appointments, consult healthcare professionals via video or chat, and access medical records.
- Professional Dashboard: Enables healthcare providers to manage appointments, verify patient information, and upload laboratory results.
- Backend System: Developed using Node.js and Firebase, ensuring secure authentication, data storage, and real-time communication.

C. System Architecture

The system adopts a client-server architecture to ensure scalability and efficient data management. Unlike traditional healthcare systems that operate in silos, the proposed system integrates multiple healthcare services into a unified platform. Geo-location features are also incorporated to connect patients with nearby verified healthcare providers.

IV. RESULTS AND DISCUSSION

The developed system was evaluated based on usability, efficiency, and performance.

- Response Time: The application demonstrated fast response times for booking and consultation features, averaging under a few seconds per request.
- User Experience: Test users reported improved convenience compared to traditional hospital visits, particularly in appointment scheduling and communication.
- Accessibility: The system reduced the need for physical hospital visits, thereby minimizing waiting times and travel constraints.

These findings align with existing studies that highlight the effectiveness of mobile health applications in improving healthcare accessibility and reducing system inefficiencies [8], [26].

Additionally, the integration of multiple healthcare services into a single platform addresses fragmentation issues identified in previous research [27], [30].

V. CONCLUSION

This study presents the design and implementation of Medicx, a mobile health application aimed at improving healthcare accessibility and efficiency. By integrating consultation, laboratory services, and pharmacy coordination, the system provides a comprehensive solution to challenges associated with traditional healthcare systems in developing regions.
Future work will focus on integrating hospital management systems, expanding security features, and incorporating health insurance functionalities to enhance system capabilities.

REFERENCES

[1] A. O. Babatunde et al., "Leveraging mobile health technology towards Achieving Universal Health Coverage in Nigeria," Public Health in Practice, vol. 2, Nov. 2021.

[2] G. T. Aboye, M. Vande Walle, G. L. Simegn, and J.-M. Aerts, "mHealth in sub-Saharan Africa and Europe: A systematic review comparing the use and availability of mHealth approaches in sub-Saharan Africa and Europe," vol. 9, Jan. 2023.

[3] E. F.-C. Kuo, J. Cho, I. Olaye, D. Delgado, N. Dell, and M. R. Sterling, "Understanding the Technological Landscape of Home Health Aides: Scoping Literature Review and a Landscape Analysis of Existing mHealth Apps," Journal of Medical Internet Research, vol. 24, no. 11, Nov. 2022.

[4] S. Khairat, S. Liu, T. Zaman, B. Edson, and R. Gianforcaro, "Factors Determining Patients' Choice Between Mobile Health and Telemedicine: Predictive Analytics

Assessment," JMIR mHealth and uHealth, vol. 7, no. 6, Jun. 2019.

[5] O. Shekoni et al., "Healthcare workers' perceptions about the use of mobile health technologies in public health facilities in Lagos, Nigeria," Sage Open Medicine, vol. 12, Jan. 2024.

[6] C. B. Aranda-Jan, N. Mohutsiwa-Dibe, and S. Loukanova, "Systematic review on what works, what does not work and why of implementation of mobile health (mHealth) projects in Africa," BMC Public Health, vol. 14, no. 1, Feb. 2014.

[7] B. Aljedaani and M. A. Babar, "Challenges in Developing Secure Mobile Health Applications: Systematic Review," JMIR mHealth and uHealth, vol. 9, no. 6, 2021.

[8] J. Morales, F. Silva-Aravena, and P. Saez, "Reducing Waiting Times to Improve Patient Satisfaction: A Hybrid Strategy for Decision Support Management," Mathematics, vol. 12, no. 23, Nov. 2024.

[9] P. Eze, C. L. Aniebo, S. Ilechukwu, and L. O. Lawani, "Understanding Unmet Healthcare Needs in Nigeria: Implications for Universal Health Coverage," Health Services Insights, vol. 18, Mar. 2025.

[10] V. O. Abah, "Poor Health Care Access in Nigeria: A Function of Fundamental Misconceptions and Misconstruction of the Health System," Healthcare Access - New Threats, New Approaches, Nov. 2023.

[11] R. Chinyakata, N. V. Roman, and F. B. Msiza, "Stakeholders' Perspectives on the Barriers to Accessing Health Care Services in Rural Settings: A Human Capabilities Approach," The Open Public Health Journal, vol. 14, no. 1, 2021.

[12] "Improving access to health care in rural communities by re-orienting and integrating patent medicine sellers into primary health care service delivery in Nigeria," South American Journal of Public Health, no. 3, 2015.

[13] D. Walker, "Sustaining the fight against medical quackery and false health information through a proficient community health care system in Nigeria," World Journal of Advanced Research and Reviews, vol. 27, no. 3, Sep. 2025.

[14] B. Ushie, K. Salami, A. Jegede, and M. Oyetunde, "Patients' knowledge and perceived reactions to medical errors in a tertiary health facility in Nigeria," African Health Sciences, vol. 13, no. 3, Sep. 2013.

[15] A. Tiwary, A. Rimal, B. Paudyal, K. R. Sigdel, and B. Basnyat, "Poor Communication by Health Care Professionals May Lead to Life-Threatening Complications," Wellcome Open Research, vol. 4, no. 1, 2021.

[16] S. Houser, C. Flite, and S. Foster, "Privacy and Security Risk Factors Related to Telehealth Services – A Systematic Review," Perspectives in Health Information Management, vol. 20, no. 1, 2023.

[17] N. Alhammad, M. Alajlani, A. Abd-alrazaq, G. Epiphaniou, and T. Arvanitis, "A systematic review of patients' perspectives on data confidentiality, privacy, and security of mobile health applications," Journal of Medical Internet Research, vol. 26, Jul. 2023.

[18] M. Hafdi et al., "Design and Development of a Mobile Health (mHealth) Platform for Dementia Prevention," Frontiers in Neurology, vol. 12, Dec. 2021.

[19] A. Adewunmi, "FHIR for Developing Interoperable Mobile Health Apps: An Exploratory Case Study," 2017.

[20] J. Nix and T. Comans, "Home Quick – Occupational Therapy Home Visits Using mHealth," International Journal of Telerehabilitation, vol. 9, no. 1, Jun. 2017.

[21] J. Hua et al., "Development of a nurse-led mHealth intervention framework for patients with chronic diseases," Digital Health, vol. 11, May 2025.

[22] W. Tumuhimbise et al., "Enhancing the implementation and integration of mHealth interventions in resource-limited settings," Implementation Science, vol. 19, no. 1, Oct. 2024.

[23] F. O. Dike et al., "Implementation and impact of mhealth in the management of diabetes mellitus in Africa," PLOS Digital Health, vol. 4, no. 4, Apr. 2025.

[24] G. D. Giebel et al., "Quality assessment of mHealth apps: a scoping review," Frontiers in Health Services, vol. 4, May 2024.

[25] A. Wai et al., "The promise of digital healthcare technologies," Frontiers in Public Health, vol. 11, Sep. 2023.

[26] S. Kernebeck et al., "Impact of mobile health and medical applications on clinical practice in gastroenterology," World Journal of Gastroenterology, vol. 26, no. 29, Aug. 2020.

[27] S. Zakerabasali et al., "Mobile Health Technology and Healthcare Providers: Systemic Barriers to Adoption," Healthcare Informatics Research, vol. 27, no. 4, Oct. 2021.

[28] A. Haleem et al., "Telemedicine for healthcare: Capabilities, features, barriers, and applications," Sensors International, vol. 2, 2021.

[29] V. Petri et al., "Clinical data integration and processing challenges in healthcare," Digital Health, vol. 11, May 2025.

[30] F. F. Raunaq et al., "Assessing the challenges to digital technology adoption in the healthcare sector," Informatics and Health, vol. 2, no. 2, Sep. 2025.

[31] T. O. Ebo et al., "Transforming healthcare delivery: A comprehensive review of digital integration," Digital Engineering, vol. 6, Jul. 2025.