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Bridging Digital Health and Field Realities: A User Review Analysis of the ANMOL Application

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Abstract
Mobile health solutions are increasingly integral to health service delivery, driven by rapid advancements in digital technology. The Auxiliary Nurse Midwifery Online (ANMOL) application (v1.0) represents a critical initiative designed to strengthen primary healthcare services in India. This application supports Auxiliary Nurse Midwives (ANMs) by enabling real-time recording of service data, beneficiary tracking, and monitoring of maternal and child health indicators. While ANMOL holds significant promise for enhancing public health outcomes, evaluating its practical effectiveness necessitates understanding user experiences. This study analyzes user reviews of the ANMOL application to explore its usability, performance, and the operational challenges encountered during field-level implementation. The insights gained from reviewing version 1.0 of the application provide a foundational understanding for evaluating subsequent iterations, such as ANMOL 2.0.

Keywords: Application, Google, ANMOL, Digital Health

Introduction
The Auxiliary Nurse Midwifery Online (ANMOL) application (v1.0), a mobile-based digital health platform, was launched by the Ministry of Health and Family Welfare, Government of India, on April 7, 2016 (1, 2). Operating as an extension of the Reproductive and Child Health (RCH) portal, ANMOL is primarily utilized by Auxiliary Nurse Midwives (ANMs) to record and manage service-delivery data at the community level (1, 2). This platform empowers frontline health workers to document and track eligible couples, pregnant women, and children, thereby facilitating the provision of maternal and child care services. It also enables systematic tracking of antenatal care, postnatal care, and immunisation activities. By transitioning from paper-based systems to digital records, the application aims to enhance data visibility, accountability, and timely monitoring within the public health system (1, 2, 3). The application, listed under "Health and Fitness" on the Google Play Store, maintains an overall user rating of 3.6, indicative of diverse user experiences. Since its initial release, the application has undergone multiple updates, including a significant upgrade in 2020, aimed at improving functionality, streamlining workflows, and enhancing overall efficiency (3).

Methods
A cross-sectional descriptive analysis was conducted on user reviews of the ANMOL application (v1.0), leveraging data obtained from the Google Play Store. The application listing was accessed via:
https://play.google.com/store/apps/details?id=org.unicef.eanmapp&hl=en_IN&gl=US.
Data were extracted in September 2021. At the time of extraction, 1,111 user reviews were available. A representative sample size of 286 reviews (25.74%) was calculated using Epi Info (version 7), chosen to ensure a 95% confidence level with a 5% margin of error, considering the total population of reviews and assuming a proportion of 50% for dichotomous outcomes, which provides the most conservative sample size estimate. Both quantitative and qualitative analytical approaches were employed. Quantitative analysis focused on rating patterns and the frequency of reported issues. Qualitative analysis involved thematic coding of review text to identify recurring concerns and user perceptions.

This process involved an iterative review of the data, open coding to identify initial themes, and focused coding to refine and categorise these themes. No specific qualitative software was used; coding was performed manually, with themes cross-referenced for consistency. A sample of the coding frame is provided in Table 1.

Results

Following data cleaning and adherence to quality completeness criteria, a total of 290 reviews were analyzed. User Rating Distribution: A substantial concentration of ratings at the extremes (76.5%) compared to moderate ratings (23.4%) indicates a bimodal distribution of user satisfaction. Specifically, 39.7% of reviews were 1-star, 36.8% were 5-star, and the remaining 23.4% were distributed across 2, 3, and 4-star ratings. The distribution exhibited characteristics of kurtosis, with clustering at both extremes, further supporting the presence of bimodal tendencies. A chi-square goodness-of-fit test demonstrated that the observed rating distribution significantly deviated from a uniform distribution ($\chi^2 = 163.59$, df = 4, $p < 0.001$), confirming a highly non-random and polarized pattern of user ratings. This distribution is visually represented in Figure 1.

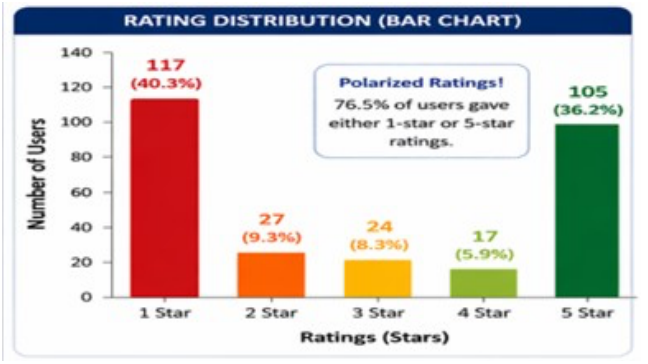

Fig 1. Rating Distribution (Bar Chart)

Reported Issues: Analysis revealed several recurring challenges, including system instability, device compatibility concerns, workflow inefficiencies, and usability barriers. Conversely, 109 users reported favorable experiences, underscoring the application's potential to support service delivery. For instance, one user expressed frustration with data synchronization, stating, "The data doesn't sync properly, and I lose all my work." Another user highlighted a software glitch, remarking, "Frequent app crashes make it impossible to use sometimes." These major issues are detailed in Figure 2.

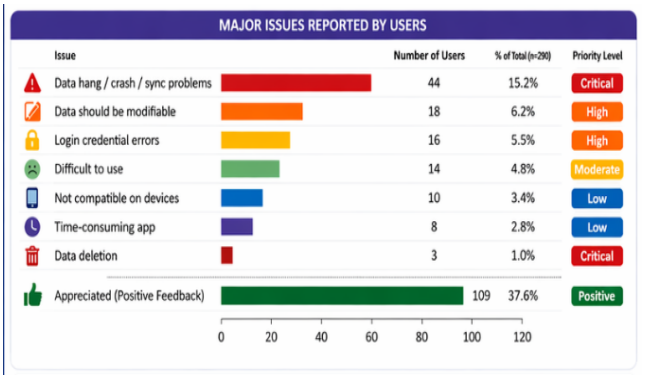

Fig 2. Major Issues Reported by Users

Temporal Distribution: The review dataset spans from 2016 to 2021, with a median around 2019. No clear temporal decline or improvement trend was observed from the aggregated data, suggesting the persistence of key issues across multiple years. While some literature refers to projected future enhancements or long-term strategic plans for software updates to address bugs and synchronization issues "after 2025" (4, 5), these do not reflect the state of the ANMOL application at the time of data collection (2021). Figure 3 illustrates the temporal distribution of reviews. Future research should investigate user ratings before and after significant upgrades of the ANMOL app, especially ANMOL 2.0, to assess the impact of these improvements (Figure 3).

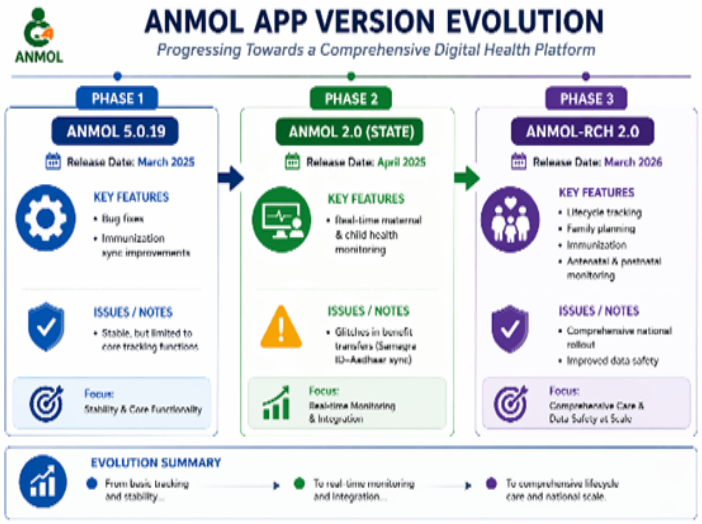

Fig 3. ANMOL Application Version Evolution

Table 1. Thematic Coding Examples

Quote	Initial Code	Final Theme
"The data doesn't sync properly, and I lose all my work."	Data loss, sync issues	Data Synchronization
"Frequent app crashes make it impossible to use sometimes."	App crashes, instability	Technical Performance
"It takes too long to enter data and navigate through menus."	Slow data entry, difficult navigation	Usability
"I can't upload Aadhaar card photos, which is needed."	Missing feature, document upload	Functional Gaps
"The app is only in English, which is hard for many ANMs."	Language barrier, accessibility	Multilingual Support

Discussion

This study reveals a distinctly divided user experience with the ANMOL application (v1.0), reflecting both its operational value and persistent limitations. A commonly reported concern relates to data synchronization. While ANMOL supports offline data entry—an essential feature in low-connectivity settings—the process of uploading stored data to the central server often appears slow and unreliable. Users frequently reported incomplete synchronization and associated errors, directly impacting routine service delivery. In addition, technical issues such as application crashes, system lags, and occasional data loss were consistently highlighted as significant barriers to effective usage. These challenges undermine user confidence and disrupt field-level workflows. Another important concern raised by users is the lack of flexibility in data management (2, 3, 4). The inability to modify or delete previously entered

records poses practical difficulties, particularly in dynamic field environments where corrections are often required. This limitation points to a need for a more adaptive system design. Usability challenges were also evident, including complex navigation pathways and time-intensive processes, suggesting the application would benefit from a more user-centered design approach. Furthermore, the restriction to English as the primary language limits accessibility for many frontline workers, underscoring the importance of incorporating regional languages (2, 3, 4). Given that the Auxiliary Nurse Midwife (ANM) application is primarily used by frontline health workers, improved language localisation could enhance usability, comprehension, and overall efficiency. Users also identified the absence of features such as image capture and upload, for instance, the ability to upload Aadhaar Card photos, as a limitation. Integrating such functionality could enhance documentation, verification, and overall service monitoring. Despite these concerns, a notable proportion of users acknowledged the application's benefits, particularly in improving efficiency, reducing duplication of work, and facilitating better community engagement. These positive aspects highlight that the core concept of the application is strong, but its effectiveness is contingent on reliable technical performance (2, 3, 4). The findings reflect a broader pattern observed in digital health interventions: even functionally valuable systems may face adoption challenges if technical performance and usability are not adequately addressed (5, 6). The relevance of this 2021 data in 2024 pertains to its utility as a baseline for longitudinal studies, allowing for a comparative analysis of user satisfaction and technical issues between ANMOL v1.0 and subsequent iterations like ANMOL 2.0. Preliminary observations of ANMOL 2.0 suggest improvements in data synchronisation and a more intuitive user interface, indicating that some of the issues identified in this study have been addressed. However, comprehensive user feedback on ANMOL 2.0 is still emerging, and a direct comparative analysis would be beneficial for future research. This foundational data set remains crucial for understanding the evolutionary trajectory of digital health tools in specific contexts.

Limitations: This study utilised Google Play Store review data accessed in September 2021, focusing on ANMOL v1.0. Consequently, the findings may not fully reflect the current state of the ANMOL application, particularly given the rapid advancements in digital health technologies and the release of subsequent versions, including ANMOL 2.0. Additionally, the inherent nature of Play Store reviews means that the demographic profile of reviewers is largely unknown, potentially introducing bias. Future research should consider a more contemporary analysis and explore methods to gather demographic data of reviewers where feasible.

Implications for Digital Health Implementation: The findings reflect a broader trend in digital health interventions: systems with high functional value but poor technical execution often results in user dissatisfaction and inconsistent adoption. Addressing technical and usability issues could significantly enhance user satisfaction and increase adoption rates among frontline health workers (2).

Recommendations

I. Technical Enhancements: Strengthen backend systems to improve data synchronisation and reduce application crashes. Implement auto-save and data recovery features to prevent data loss. Optimise application performance for low-end mobile devices and improve login and access reliability, including enhanced offline capabilities.
II. Data Management and Usability: Incorporate features to edit, update, and delete previously entered data, with proper audit trails. Introduce confirmation prompts and validation checks to reduce entry errors at the initial stage. Provide a revision history/log system to maintain data integrity while allowing for necessary corrections. Introduce multilingual support, including regional languages, to enhance comprehension and usability.
III. Functional Enhancements: Enable functionality to capture and upload photographs within the application for better documentation and verification. Ensure that multimedia uploads are optimised for low bandwidth usage.

Conclusions

The ANMOL application holds significant promise as a digital tool for strengthening health service delivery at the grassroots level. However, its full potential is currently constrained by technical limitations and usability challenges. Addressing these issues through systematic improvements and user-focused design enhancements will be critical to ensuring sustained adoption, user satisfaction, and overall effectiveness (2, 5).

Credits: ANMOL, Google application reviews, and Ministry manuals have been considered while writing this paper.

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