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Evaluating the Usability, User Experience, and Satisfaction of the E-Ruhuka Mental Health Mobile Application Among University Students in Rwanda, 2025

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ABSTRACT

INTRODUCTION: Mental illness affects millions of people worldwide, and Innovative digital solutions are essential to improving mental health literacy, overcoming access barriers, and enhancing engagement with care. This is a pilot cross-sectional survey study designed to evaluate a mental health application (App) usability in Rwanda.

METHODS: A cross-sectional study design was employed to assess the usability, user experience, and satisfaction with the E-Ruhuka app. A total of 78 students from the University of Rwanda, College of Medicine and Health Sciences, participated in the study. The evaluation utilized the System Usability Scale (SUS), the User Experience Questionnaire (UEQ), and the Client Satisfaction Questionnaire (CSQ) to measure key outcomes.

RESULTS: The majority of participants (78.3%) rated their experience with the App as good or excellent, with 74.4% expressing high satisfaction. However, only 51.3% rated the App's usability as good or acceptable based on the System Usability Scale Questionnaire (SUSQ). Participants provided specific recommendations to enhance usability, including improved navigation, multilingual support, offline access, interactive features such as live chat with mental health professionals, and an emergency support function.

CONCLUSION: Findings from this pilot study indicate high user satisfaction and positive engagement with the E-Ruhuka app. However, usability challenges highlight the need for refinements to improve functionality and accessibility. Implementing suggested improvements will be essential to maximizing the App's effectiveness in promoting mental health awareness and support.

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INTRODUCTION

Mental illness is a major global health challenge, significantly impacting individuals and societies [1]. According to the World Health Organization (WHO), approximately one in eight people, the equivalent of 970 million individuals, suffer from mental and behavioral disorders, with anxiety and depression being the most prevalent [2]. Mental and substance use disorders were the fifth leading cause of global disability-adjusted life years (DALYs) in 2010 [3], and more recent estimates suggest that these conditions account for 32.4% of years lived with disability (YLDs) and 13.0% of total DALYs worldwide [4]. This burden is particularly pronounced in Low- and Middle-Income Countries (LMICs), including sub-Saharan Africa, where mental disorders contribute to approximately 10% of their total disease burden [5]. Despite this high prevalence, mental health services in these regions remain critically underdeveloped. The rising prevalence of mental disorders can be attributed to different risk factors such as poverty, violence, poor education, unemployment, lack of housing, oppression, stigma, and trauma [1,6,7]. In particular, there are serious gaps in knowledge and mental health treatment in Sub-Saharan Africa [1,3].

Mental health disorders are of particular attention in Rwanda, whereby more than 20% of Rwanda's general population, and 52% in the sub-sample of survivors of the 1994 genocide against the Tutsi [8] have evidence of significant trauma and mood disorders. Despite the high prevalence of these mental disorders, the utilization of mental health services is still very low [8]. This may be due to different factors, including fear of mental health stigma and lack of awareness of mental health, sociocultural barriers, and financial and geographical accessibility [1]. Prior studies indicate that the major barriers comprise limited availability and affordability of mental healthcare services, insufficient mental healthcare strategies, lack of education about mental disorders, and negative attitudes toward mentally disordered patients [1,9]. In response, the government of Rwanda has established mental health services in district hospitals [8]. In addition, the Government of Rwanda has tried to implement universal health coverage (UHC) that allows all Rwandans access to health services and ensures that these services do not expose the users to financial hardship. Despite these initiatives, there is still a major gap in mental health service utilization [1].

The development of the E-Ruhuka application was informed by Rwanda's ongoing investment in digital infrastructure and the increasing demand for accessible mental health services. National statistics indicate that mobile phone ownership has grown significantly in recent years, reaching 85% of households by 2024, with internet penetration at 34.4% [15]. However, smartphone penetration remains limited at 14.6% [16], underscoring the need for inclusive, low-bandwidth solutions. Companies like Babyl have built on these efforts by the government of Rwanda through delivering medical services via phone calls and internet-based applications [17]. However, these telehealth services have not yet incorporated mental health services. We believe that e-Mental health presents a valuable opportunity to address existing challenges and to enhance mental health care in Rwanda. It can offer a means to meet patients' emotional and psychological needs while expanding access to essential services. As a multidisciplinary approach integrating information technology and computer science, e-Mental health enables the remote delivery of psychiatric care to improve service accessibility in underserved and distant clinical areas.

The aim of this pilot study is to evaluate the usability, user experience, and satisfaction of the E-Ruhuka e-Mental health app among University of Rwanda students and gather recommendations for improving the App.

METHODS

Settings

Researchers recruited participants from two campuses in Rwanda: one located in the City of Kigali at Remera Campus and another located in the Southern Province at Huye Campus. The campuses were specifically chosen because they host two main mental health centres that can provide mental health support services. The Remera campus hosts the University's Center of Mental Health, while the Huye campus has a facility that provides clinical psychology services. These settings included participants who spoke and read English and were used to using smartphone apps.

Study Subjects

The target group for this study consisted of students aged 18–25 years who attended the University of Rwanda, College of Medicine and Health Sciences, and who had a self-reported history of a mental health disorder. All interested participants completed an informed consent and were trained in using the App. Inclusion/exclusion criteria consisted of 1) owning a smartphone, 2) being able to understand and write English, 3) being 18 years or older, and 4) having a self-reported history of a mild to moderate mood disorder. A convenience sampling method was used to recruit individuals who were accessible and willing to participate in the study.

Data Collection Tools

The following questionnaires were used in this study. The System Usability Scale Questionnaire (SUSQ) is a 10-item self-reported measure used to assess the usability of the E-Ruhuka app. Each item is scored on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale has demonstrated good reliability, with a Cronbach's alpha of 0.62. Total scores range from 10 to 50. These scores were then converted to percentages, resulting in a range of 20 to 100. Based on score interpretation, a score of 100-90 is considered excellent, 89-80 good, 79-70 acceptable, 69-60 poor, and 59 or below bad. This tool is widely used in assessing usability in testing systems and applications [18,19].

The User Experience Questionnaire (UEQ) is a 6-item self-reported questionnaire used to measure participants' user experience of the interactive App. Each item is scored on a 7-point Likert scale, ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Total scores range from 6 to 42. The scale has demonstrated good reliability, with a Cronbach's alpha of 0.84. A score of 42-38 is considered excellent, 37-34 good, 33-30 acceptable, 29-26 poor, and 25 or below bad. This tool is popularly used to determine whether an app is user-friendly and has features that are easy to navigate. This measure possesses excellent reliability and validity [19,20].

The Client Satisfaction Questionnaire (CSQ) is an 8-item self-reported questionnaire designed to assess the participants' satisfaction with the App. It has demonstrated good reliability (Cronbach's alpha=0.91). Total scores range from 8 to 56. Scores between 56-50 are excellent, 49-44 good, 43-38 acceptable, 37-32 poor, and 31 and below very poor. This tool is a standardized measure to assess satisfaction with services provided. It was adapted to assess services and products an app may offer to users [19,21].

Intervention: E-Ruhuka Application

We developed an e-Mental health application (E-Ruhuka) (Figure 1), which is the first-ever e-Mental health app in Rwanda, designed to support mHealth professionals and to serve as an alternative to traditional mental health services. The App includes features that provide essential mental health education, self-help advice, and practical tips for managing mental health challenges. Additionally, it offers self-screening tools to help users identify and assess their mental health status. E-Ruhuka offers three distinct user interfaces, each tailored to serve its respective users effectively: clients, therapists, and technology/server administrators.

The client interface provides essential self-help tools and facilitates access to professional mental health support. It includes self-screening tools that allow users to assess their mental health status through validated measures, which can be shared with psychologists and other mental health providers. It offers psychoeducation resources that provide evidence-based materials on mental health, coping strategies, and wellness. Mindfulness and relaxation exercises, such as guided meditation and breathing techniques, are available to help users manage stress. A journaling feature enables users to track their thoughts and emotions, designed to promote self-reflection. Finally, the platform allows patients to have full information on available mental health services and to book appointments with therapists directly if needed. The therapist interface is designed to support mental health professionals in effectively managing patients. Therapists can access patient screening scores to review assessment results and to make informed clinical decisions. The system also includes an appointment management feature, enabling therapists to view and manage scheduled appointments. The technology/server administrator interface ensures the platform's smooth operation and security. This interface includes backend management for system maintenance, data storage, and technical updates, and helps to ensure security and data privacy to meet ethical and legal standards.

Data Analysis

Quantitative data collected from the online surveys were analyzed using IBM SPSS Statistics 29. Descriptive statistical methods were utilized to summarize the data, including the calculation of percentages and frequencies, and to evaluate participants' responses regarding the usability, user experience, and satisfaction with the App. These analyses provided insights into the participants' overall interaction with the system, their level of satisfaction, and the ease of use of the platform. Furthermore, three open-ended qualitative questions were asked to gather participants' recommendations for improving the App: 1) What additional features could be incorporated to increase the App's impact on promoting mental health awareness? 2) How could the App be improved to offer more comprehensive and personalized mental health support? 3) What design or accessibility considerations could be implemented to ensure the App is user-friendly and accessible to all users?

Ethical Considerations

Ethical approval for this cross-sectional study was obtained from the University of Rwanda, College of Medicine and Health Sciences Institutional Review Board (No 544/CMHS IRB/2023).

RESULTS

Characteristics of participants

Seventy-eight (N=78) participants were recruited for this study (Table 1). They averaged 22.7 years of age (SD = 1.9), and the majority were male (63%). More than half (51.3%) were second-year students, and 28% were in their fourth year. Ten percent (10.3%) were enrolled in a master's program (Table 1). Nearly all participants were single (98.7%).

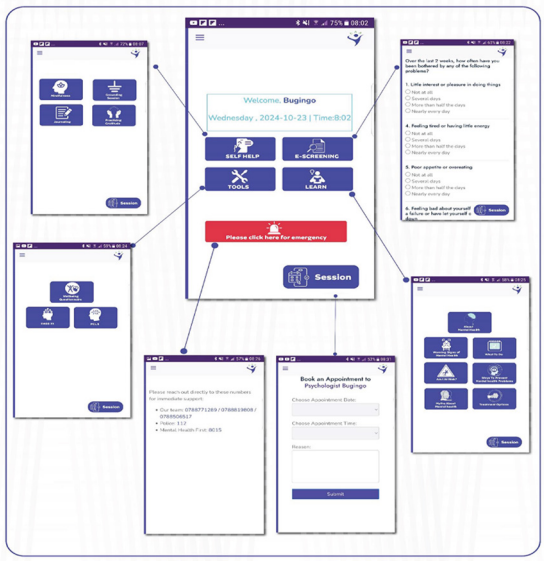

Figure 1: *Graphic client interface of E-Ruhuka*

Table 1: *Sociodemographic characteristics of participants (N=79)*

Variables	Frequency	Percentage
Gender		
Male	49	62.8
Female	29	37.2
Education		
year 2	40	51.3
year 3	8	10.3
year 4	22	28.2
Master's student	8	10.3
Marital status		
Single	77	98.7
Married	1	1.3
Age [mean (SD)]	[22.3 (1.9)]	

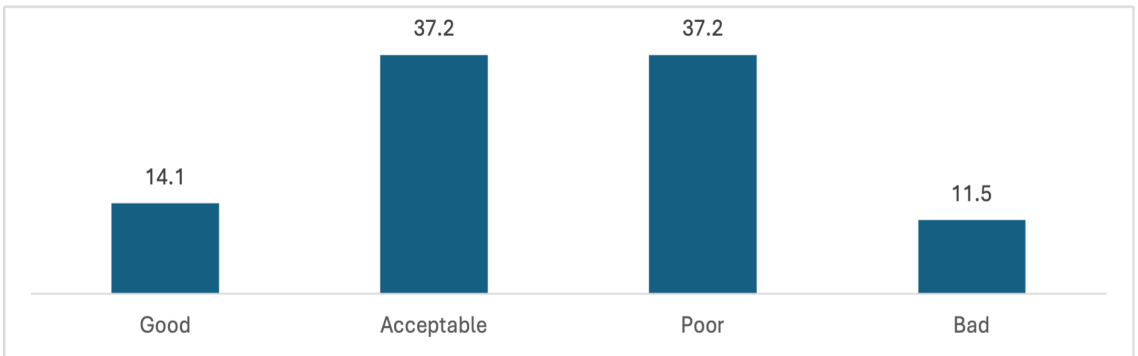

Figure 2: *Usability rating of the E-Ruhuka application on the SUSQ.*

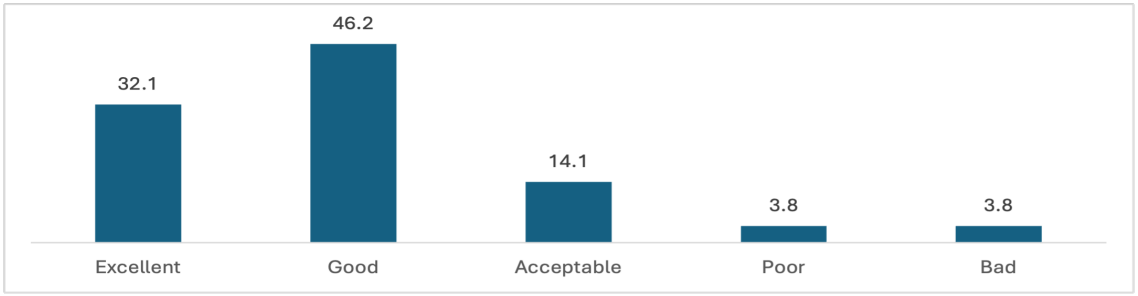

Figure 3: *User experience rating of the E-Ruhuka App on the UEQ.*

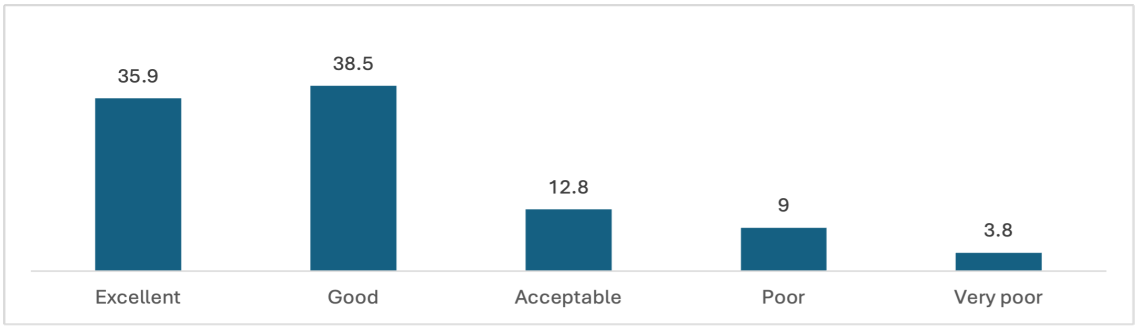

Figure 4: *Level of satisfaction with the E-Ruhuka App on the CSQ.*

Table 2: *Additional features to be incorporated to increase the App's impact in promoting mental health awareness*

Theme	n	Sub-theme	Quotes
Educational content	8	Include more educational videos on coping strategies.	Add videos of those who were helped by the App (of course, with their permission to do so), which would give testimony and courage to other users who came after them
Gamification	8	Adding gaming features	You can incorporate gaming features; the game could be designed as a way of relieving stress. When possible, it should be fun.
Social interaction	6	Allow users to interact with mental health experts.	The App could be improved by incorporating AI-driven personalized recommendations, tailored mental health plans, mood tracking, integration with wearable devices for real-time feedback, and access to live chats with mental health professionals for more comprehensive support.
Chat bot	5	Include chatbot	Include a chat assistant AI
Peer-to-peer chat	4	Provide a peer-to-peer chat	Create spaces for users to share experiences and support each other. Connect users with trained peer supporters for one-on-one conversations.

n: Frequency

Usability of E-Ruhuka

The results on the SUSQ (Figure 2) indicated that 51.3% of participants rated the App as having good or acceptable usability, while 37.2% reported poor usability, and 11.5% gave it a low usabil-ity score.

The results of the UEQ (Figure 3) showed that 78.3% of users reported excellent or good experiences, while 14.1% found it acceptable, and 7.6% rated it as poor or bad.

Table 3: *Improvement of the App to offer more comprehensive and personalized mental health support*

Theme	n	Sub-theme	Quote
Follow-up reminders	9	Send personalized check-ins based on user history.	Personalize reminders for mindfulness exercises would add a supportive touch. More localized resources, like contacts for a nearby support group, would be beneficial.
24/7 support	7	Offer live chat with mental health professionals.	You should provide reactions and respond to the patients.
Data insights	4	Allow users to track their progress over time.	The App could be improved by incorporating AI-driven personalized recommendations, tailored mental health plans, mood tracking, integration with wearable devices for real-time feedback, and access to live chats with mental health professionals for more comprehensive support. Use simple terms in questions and provide updates concerning mental health issues. Notifications by either messages or email to notify when the user has booked an appointment, paid for the appointment, and any changes made to their account.
Wide range availability	4	Make it broader	There should be more mental health campaigns in the larger population and different areas with the purpose of increasing knowledge about mental health conditions in Rwandans. As technology continues to advance, it is essential for software development companies to prioritize accessibility features to ensure that all users can access and interact with their products. Accessibility features not only improve user experience but also make technology more inclusive for individuals with disabilities.
	4	Provide a questionnaire to tailor recommendations	You should leave a space for recommendations
Emergency	2	Crisis management helps	Crisis Management Tools and Emergency Action Plans should be used to help users develop personalized crisis plans that outline steps to take in times of distress, including emergency contacts and coping strategies.

n: Frequency

Satisfaction with the E-Ruhuka

In terms of overall satisfaction with the E-Ruhuka app, the majority of participants (74.4%) rated their experience as excellent or good on the CSQ, while 12.8% found it acceptable and 12.8% reported poor or very poor satisfaction levels (Figure 4).

Proposed Enhancements to Strengthen the App's Impact on Mental Health Awareness and Accessibility

Respondents provided suggestions on ways the App could be improved to maximize its effectiveness in promoting mental health awareness, offering personalized support, and ensuring accessibil-ity for all users. To expand the App's role in mental health awareness, respondents suggested inte-grating additional educational videos on coping strategies, incorporating interactive gaming fea-tures, enabling direct communication with mental health practitioners, integrating a chatbot, and in-troducing a peer-to-peer chat function (Table 2). To enhance the App's capacity to provide tailored mental health support, the participants recommended adding follow-up reminders, incorporating a live chat feature with mental health professionals, and enabling users to track their progress over time. Furthermore, respondents emphasized the importance of broadening the App's reach, creating a dedicated space for user recommendations, and introducing an emergency support feature for crisis management (Table 3). Finally, to enhance usability and accessibility, respondents proposed

Table 4: *Design or accessibility considerations could be implemented to ensure the App is user-friendly and accessible to all users*

Theme	n	Sub-theme	Quotes
Simple navigation	9	Ensure the menu is easy to navigate.	To ensure the App is user-friendly and accessible to all users, implement features like customizable font sizes, high-contrast themes, screen reader, and compatibility. Additionally, consider adding offline access, voice commands, and inclusive design principles to accommodate users with varying abilities.
Multilingual support	8	Add options for multiple languages to reach a wider audience.	The user could choose different languages, including our local language, Kinyarwanda. This way, there won't be a language barrier to anyone who needs help. Being able to change the language from English to other languages, like Kinyarwanda, is important because most of the clients will be Rwandan.
Visual accessibility	6	Increase text size and contrast for better readability.	Increase the font size of the advice on the App.
Offline mode	3	Provide offline access to certain features.	Provide offline access and links to educational content, exercises, and self-help tools.

n: Frequency

several design improvements. These included ensuring an intuitive and easy-to-navigate menu, in-corporating multiple language options to serve a diverse audience, optimizing text size and contrast for better readability, and enabling offline access to key features for users with limited internet connectivity (Table 4).

DISCUSSION

To the best of our knowledge, this is the first study to evaluate the usability, user experience, and satisfaction with an e-Mental health tool in Rwanda. The study findings indicate mixed scores for usability but mostly good to excellent ratings for participant user experience and satisfaction with the E-Ruhuka application. These findings align with previous research that has shown the usability and effectiveness of e-Mental health applications in improving accessibility, engagement, and user satisfaction [6,11,12,22].

Existing literature highlights the growing global use of mental health apps in health education and care, particularly in mental health settings [6,10,11]. Prior research conducted in clinical settings suggests that mobile health (mHealth) can complement face-to-face treatments, enhance patient en-gagement, improve adherence to therapy, optimize clinician time and resources, and ultimately lead to better treatment outcomes while reducing the risk of relapse [11]. Our findings are consistent with this evidence and confirm that well-designed digital mental health tools can serve as effective adjuncts to traditional care services.

Moreover, e-Mental health tools have been shown to reduce stigma, improve mental health literacy, and encourage help-seeking behavior [12]. This is particularly important in Rwanda, where cultural stigma around mental illness may hinder access to care. The COVID-19 pandemic has further emphasized the role of digital health, with lockdowns accelerating the adoption of online mental health services globally [13]. The E-Ruhuka application, tailored to the Rwandan context, reinforces these findings by demonstrating that culturally adapted digital mental health tools can be effective, engaging, and well-received by users.

Our findings highlight that the App is easy to use and offers a positive user experience with rela-tively high satisfaction ratings, yet specific significant improvements could be made. These results are consistent with prior evaluations, emphasizing the growing role of digital platforms in mental health care. Despite the easy usage of the App, specific recommendations were given to improve the App, including the use of a 1-time password as an alternative recovery option for users without email access, ensuring easier account recovery. Others

suggested ways for users without smartphones or reliable internet access to have access to these services to promote equity and inclu-sivity, such as offering services compatible with non-smart basic mobile phones, including the use of USSD Code and short message service (SMS).

Although Rwanda has made substantial progress in expanding ICT infrastructure, mobile phone ownership has risen from 67% in 2017 to 85% in 2024, and internet penetration reached 34.4% [15]. However, smartphone ownership remains relatively low at 14.6% [16]. As such, future iterations of the E-Ruhuka app should consider multi-platform delivery options to ensure broad accessibility, including USSD and SMS-based services. This echoes findings from other low-resource settings where hybrid digital approaches have helped reach underserved populations.

As noted in earlier research, however, challenges such as digital literacy, accessibility barriers, and sustained engagement remain key concerns in digital mental health adoption. During this piloting phase, the App was available only in English. To ensure cultural relevance and inclusivity, it will need to be adapted to the Rwandan context, with all content translated into Kinyarwanda, the primary language spoken and understood by the target users. Future studies should explore strategies to enhance long-term user engagement, address digital disparities, and improve intervention effectiveness across diverse populations. Some students rated the App as having poor usability, possibly due to their prior exposure to more advanced or feature-rich applications [23,24]. Users accustomed to high-functionality apps may find simpler applications lacking, even if these are purposefully designed to be minimalistic and user-friendly [23,24].

There are a number of limitations of this pilot study that deserve mention. First, this was a survey study among young students, and the results may not be generalized to older individuals who are less familiar with mHealth technology. Second, this survey included a limited number of partici-pants and feedback from a larger number of diverse subjects could offer more generalized sugges-tions for improvements to the App. Third, all the participants were able to read and speak English. A translated version of the App to be used among Rwandese is currently being created. Finally, we did not assess changes in mental health literacy based on information supplied through the App. We are currently implementing a clinical trial designed to assess the impact of the App among per-sons with mental health problems and trauma in Rwanda.

CONCLUSION

Despite the limitations, the findings of this study demonstrate that E-Ruhuka is a highly usable and well-received digital tool, with the majority of participants reporting positive experiences and high satisfaction levels. These results highlight the potential of E-Ruhuka to enhance mental health liter-acy, accessibility, and service delivery, particularly in resource-limited settings. While the study provides promising insights, future research should focus on long-term engagement, effectiveness in diverse populations, and integration with existing mental health services. Scaling up E-Ruhuka could play a critical role in bridging the mental health care gap in Rwanda and beyond, offering an innovative and accessible solution to address mental health challenges.

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