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An Investigation of Usability Satisfaction with Tanzania Government Mobile Apps for People with Disabilities

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Abstract

This study investigates the usability of Tanzanian government mobile apps for people with disabilities. Understanding their usability is vital, given their crucial role in citizen engagement and inclusivity. However, research on this topic remains limited. This study employed the mGQM framework to evaluate the usability of five government mobile apps through a field study. Findings revealed mixed levels of user satisfaction. While some usability attributes were deemed satisfactory, others, such as feedback provided via the mobile apps, the arrangement of the main menu, response time, the language used, ease of learning to use the mobile apps, text size, font type, text color, screen layout, voice assistance and multimedia usage, fell short of user expectations. The study provides valuable recommendations for policymakers and stakeholders to enhance the usability of government mobile apps, ultimately improving citizen experience and service delivery.

Keywords: *Disabilities, Inclusion, mGQM, Usability, Mobile Apps, Government, Tanzania*

1. Background

Digital technologies change how public services are delivered, business processes are executed, and people communicate (Magesa & Jonathan, 2022). Digital technologies stimulate economic growth, and social conditions support economic activities such as trade, agriculture, education, health, and entertainment (David et al., 2025; Tripathi & Inani, 2020). Leveraging the transformative power of digital technologies, the government of Tanzania has invested significantly in information technology to deliver public services. Specifically, the government has invested in strengthening regulations, infrastructure, and service delivery. It has also invested in training people who use technology to access public electronic services and information. These digital transformations have increased the efficiency of service delivery, increased transparency, improved accessibility, and increased citizen engagement in government activities (Mandari & Koloseni, 2022). Digital transformations should not be tools for widening the digital divide, as well as economic and social inclusion gaps among people with disabilities and those identified as without disabilities. Since e-government services are offered through digital platforms, providing e-government-inclusive services is paramount and a moral obligation of the government to avoid unjustifiable discrimination (Abdurahman, 2024; Kamoun & Almourad, 2014).

Further, to strengthen resilience and ensure social sustainability, the e-government services should not leave anyone behind (Uutsi & Mufeti, 2021). The Tanzania Policy on Disability emphasizes the need to provide a conducive environment for people with disabilities to engage in productive work for their development. It also emphasizes on the utilization of available resources for improved service delivery (The Persons with Disabilities Act (Chapter 183 R.E. 2023)). About 11.2% or 6.9 million people have a disability in Tanzania (NBS, 2022), whereby approximately 9% of households have at least one member with a disability. People with visual, auditory, motor, and cognitive disabilities can have difficulty accessing the e-service and information. Henceforth, ensuring the accessibility of inclusive e-government services is essential. This will increase access to information and e-government services, and improve the quality of life for people with disabilities, ultimately reducing social and economic isolation.

A few studies have investigated the usability and accessibility of government websites in Tanzania for people with and without disabilities (Elisa, 2017; Kavuta & Charles, 2023; Mtebe & Kondoro, 2017; Nanji & Rutenge, 2024). In these studies, the findings indicate that government websites suffer from usability and accessibility issues, thereby denying people with disabilities the opportunity to utilize e-government services offered through them. Since previous studies focused on the usability and accessibility of government websites, it is worth evaluating the current implementation status of usability and accessibility in other e-service delivery channels, such as mobile apps. Due to the global adoption of smartphones, people are shifting to using mobile apps rather than traditional websites (Wishah et al., 2017). In this connection, there is a growing global trend to deliver government services through mobile apps (Castilla et al., 2023; Johansson et al., 2015; Lee, 2024) because mobile apps have the potential to improve the service delivery, efficiency, and effectiveness of government operations (Sandoval-Almazán et al., 2012). Therefore, it is essential to extend the investigation to usability and accessibility in mobile apps, given their potential for e-government service delivery and increased usage.

Moreover, there is a shortage of studies in Tanzania that focus on user satisfaction with the usability and accessibility of e-government services delivered through mobile apps and other online platforms. Therefore, the primary objective of this study is to evaluate the usability and accessibility of Tanzanian government mobile applications for people with disabilities in accessing e-government services, using subjective usability metrics. Specifically, it investigates user satisfaction in accessing e-government services through mobile apps.

2. Literature Review

2.1 Mobile Apps and Government Mobile Apps

The delivery of ICT services to customers has changed dramatically, enabling people to access e-services via mobile devices rather than computer-based applications. Accessing e-services using a personal computer is constrained by several factors, such as portability, affordability and mobility. With the development of mobile apps, access to various e-services and information has become easier. The reason is that mobile apps are run on small handheld devices, are easy to use and can be accessed anywhere and anytime (Khan et al., 2023; Phongtraychack & Dolgaya, 2018). Most organizations currently deploy mobile apps as alternatives to computer-based applications to communicate their products and information to consumers.

Similarly, because most citizens live in rural or remote areas, governments, particularly in developing countries, struggle to communicate services and information to citizens due to limited resources. E-government enhances the sharing of e-services and information; however, sharing of e-services through e-government platforms has been challenging for citizens, chiefly due to mobility issues (Kushchu, 2007).

However, with the growing use of mobile phones, most governments have decided to supplement e-government with mobile government (m-government) to deliver e-services and public information to citizens. Among the most used m-government technologies are mobile apps. This modality reduces operational costs for government e-service delivery because mobile service providers own the communication infrastructure, and citizens own mobile phones. The government of Tanzania, through the Electronic Government Authority (eGA), has leveraged m-government by developing an eGA app store that enables access to government-owned mobile apps (URT, 2019).

2.2 Mobile Application Usability

Usability is the degree to which consumers can use a product to meet the stipulated objective effectively, efficiently and satisfactorily (Bevan, 1999; Punchoojit & Hongwarittorrn, 2017). When software is designed with all usability principles in mind, it is more likely to be used and to succeed in the market. More customers are looking for usable products; if a product is considered unusable, consumers can find alternative usable options. As a result, the product will fail. Usability is measured by considering the following key issues: Firstly, the product should allow users to become familiar with it quickly on first use. Secondly, the product should allow users to achieve its main objectives. Thirdly, the product should enable users to remember how to use its interface on subsequent visits (Punchoojit & Hongwarittorrn, 2017).

Like other information systems, usability is considered the main factor for the success of any mobile application (Alsanousi et al., 2023). This is because limitations of the mobile apps, such as small screen size, mobile context, data entry methods, navigation, inability to view multiple windows, connectivity and processing speed, increase difficulty in the usage of mobile apps (Nayebi et al., 2012; Phongtraychack & Dolgaya, 2018). Nevertheless, scholars have shown that the novelty of mobile apps and their related functions is becoming a challenge in evaluating usability (Hussain & Kutar, 2012). Several studies have shown that Android apps lose about 77% of their active users within the first three days after installation due to usability issues (Swaid & Suid, 2018). This finding does not exclude mobile government apps. Given that government mobile apps are considered effective alternative platforms for communicating public services and information to citizens, there is a need to ensure that all government mobile apps are developed in accordance with usability guidelines.

Currently, usability testing has been integrated into the mobile development process and can be conducted iteratively to ensure the final mobile app is usable (Swaid & Suid, 2018). Integrating usability testing into the mobile development process incorporates usability considerations throughout the development stages, potentially enhancing mobile app usability.

2.3 Evaluation of Mobile Application Usability Metrics

Measuring usability in mobile apps has been challenging due to the limited set of available metrics, particularly for evaluation. Most of the available metrics were designed to evaluate the usability of computer-based applications. Given that mobile apps have different features from computer-based applications, applying these metrics to evaluate mobile app usability becomes very difficult (Hussain & Kutar, 2012).

To date, several metrics have been used to measure the mobile app usability. The available metrics include the Mobile Goal Question Metric (mGQM), the Quality in Use Integrated Measurement (QUIM), and the Software Usability Measurement Inventory (SUMI). The mGQM was developed based on the GQM model, which starts with the application's goals and then redefined into questions. Lastly, the metric for each question is developed (Hussain & Kutar, 2012). The GQM model was developed based on ISO 9241-11, focusing primarily on effectiveness, efficiency, and satisfaction (Hussain & Kutar, 2012; Hussain & Omar, 2020).

Quality in Use Integrated Measurement (QUIM) is used to evaluate usability when users have little knowledge of usability issues in the application (Hussain & Kutar, 2012). Software Usability Measurement Inventory (SUMI) was developed to provide more information on specific usability areas: effectiveness, efficiency, helpfulness, control, and learnability (Rangraz Jeddi et al., 2020).

All these evaluation metrics have different limitations. The major limitation is that most of the evaluation metrics were not developed purposely to evaluate the usability of mobile apps. As a result, they are ineffective when evaluating mobile usability (Tahir & Arif, 2015). Furthermore, most available evaluation metrics do not explain how measurement dimensions should be included in evaluating mobile application usability (Zahra et al., 2017). This study employed mGQM to evaluate the usability of government mobile apps. mGQM is considered effective because it provides clear information about the metric, guidelines and evaluation of mobile application usability (Weichbroth, 2024; Zahra et al., 2017). Further, it has been specifically developed to evaluate the usability of mobile apps.

3. Research Methodology

Two major methodologies can be applied in evaluating the usability of mobile apps: laboratory experiments using emulators and actual mobile devices, and field studies using actual mobile devices (Zhang & Adipat, 2005). This study examines the usability and accessibility of government mobile apps in real-life contexts, focusing on user behavior and user attitudes of people with disabilities towards mobile government applications. Therefore, the study employed a field study to conduct usability testing. The field study approach is used in the context in which the study is focused on evaluating the usability of mobile apps in a real-world environment (Zhang & Adipat, 2005).

Individuals with disabilities have the right to be included in society activities and access equal opportunities. Therefore, five government mobile apps that reflect society activities and access to equal opportunities, such as economy and finance, employment opportunities, the fight against corruption, health, as well as legal and human rights were selected to examine their usability. These mobile government applications include GePG, Ajira Portal, Takukuru, NHIF and Haki. GePG is the government mobile application primarily used for government-related payments, the Ajira Portal is used for applying for public sector posts, the Takukuru App is used for reporting corruption, the NHIF app is used for accessing membership information and health insurance details, and the Haki App is used for filing complaints with the Commission for Human Rights and Good Governance (CHRAGG). The study purposively selected a few individuals with disabilities based on their knowledge and experience using mobile apps (i.e., the application and user interface) through the Tanzania Federation of Organizations of Persons with Disability (SHIVYAWATA), as proposed by Nielsen (1994). Respondents who have used or are currently using any of the above mobile applications were only considered. mGQM comprises subjective and objective metrics. However, the current study employed subjective metrics to assess the usability of the five mobile apps, as it focuses on users' perceptions and opinions regarding satisfaction with mobile government applications. A total of 110 responses were initially collected. Prior to analysis, a strict data-cleaning protocol was implemented to detect and correct data anomalies, ensuring the data was complete, accurate, consistent, and usable for analysis. This led to the exclusion of 21 responses. The specific exclusion criteria for these data points were the presence of substantial incompleteness of the main questions, resulting in completion rates of $\leq 20\%$.

To ensure this did not bias our data, we evaluated the mechanism underlying the missingness. To do so, the study employed the Missing Completely at Random (MCAR) approach proposed by Little (1988). This approach emphasizes that the probability of a value

being missing is entirely independent of both the observed and unobserved variables (Allison, 2009). Findings from the MCAR test indicate no significant effect ($p > 0.143$).
The findings imply that substantial incompleteness of the main questions was largely attributable to random external factors rather than to a systematic pattern tied to participant demographics, disability type, or digital literacy levels. The random nature of missing data confirms that excluding the 21 responses does not introduce systemic selection bias into the final analytical sample ($N = 89$).

The data collection employed a purposive sampling approach to identify respondents with disabilities and some experience using e-government mobile apps. Since most people with disabilities are digitally isolated, obtaining respondents with experience using the selected government applications was difficult (Mason et al., 2021; Pettersson et al., 2023). Therefore, it took seven (7) months, from February to August 2024, to collect substantial data for the study. Respondents were recruited from various sources that keep registers of people with disabilities, including the Tanzania Federation of Disabled People's Organizations and local government leaders. The data collected were sufficient for usability evaluation of the mobile apps, since usability studies are traditionally small-sample studies, in which even 10±2 respondents are enough to detect 80% of usability problems in an information system (Hwang & Salvendy, 2010). Table 1 shows that most respondents were young males who used one or more of the selected Government mobile apps once to three times a week for one to three years.

Table 1: Demographic Characteristics

Demographic Characteristics/Groups	Frequency	Percentage
Age		
18-34	65	73%
35-50	22	25%
51 and Above	2	2%
Gender		
Male	71	80%
Female	18	20%
For how long have you been using the Government Mobile App		
Less than 1	12	13%
Year 1 - 3 Years	56	63%
More than 3 Years	21	24%
Frequency of Accessing Government Mobile App (per week)		
1 - 3 times	67	75%
4 - 6 times	11	12%
7 - 9 times	6	7%
More than 10 times	5	6%

4. Findings

The mean scores were used to assess satisfaction for each subjective metric. Table 2, Figure 1, and Figure 2 present the study's results. Table 1 presents the results as means and percentages; Figure 1 presents the same results on a metric scale in a diagrammatic format; and Figure 2

presents the same results as percentages. A score below the mean of 2.5 (50%) indicates poor user satisfaction and, hence, poor usability.

Table 2: Means and Percentage Analysis on Subjective Metrics

Subjective Metrics	Question	GePG		Ajira Portal		Takukuru		NHIF		Haki	
		Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
S1-Rating scale for appropriate feedback	6	2.5	50	2.3	46	2.3	46	3.4	68	2.4	48
S2-Rating scale for screen orientation	7	3.3	66	3.6	72	4.3	86	2.8	56	3.4	68
S3-Rating scale for navigation	9	3.7	74	3.5	70	2.5	50	3.4	68	4.5	90
S4-Rating scale for the main menu	8	2.3	46	2.3	46	4.7	94	2.5	50	2.4	48
S5-Ease to use the virtual keyboard	2	3.8	76	3.6	72	3.2	64	4.6	92	4.6	92
S6-Rating scale for ease of understanding output	1	4	80	3.7	74	3.5	70	3.6	72	4.7	94
S7-Rating scale for loading application	4,5	2.9	58	2.9	58	4.3	86	4.3	86	4.6	92
S8-Rating scale for time to respond	3	2.5	50	2.5	50	2.8	56	3.4	68	3.5	70
S9-Rating scale for task effort	14,15	3.2	64	3.2	64	4.3	86	4.5	90	4.3	86
S10-Rating scale for finding help	11	2.8	56	2.7	54	3.6	72	3.4	68	4.2	84
S11-Rating scale for the usefulness of help	10	3.7	74	3.6	72	3.5	70	4.4	88	3.5	70
S12-Rating scale for tutorials	12	3.1	62	3.1	62	4.3	86	4.5	90	4.4	88
S13-Ratingscale for appropriate language	13	2.3	46	2.3	46	2.1	42	3.8	76	4.7	94
S14-Rating scale for appropriate content	21	3.5	70	3.7	74	2.4	48	3.2	64	4.8	96
S15-Rating scale for ease of learning	16	2.5	50	2.6	52	2.4	48	2.7	54	3.2	64
S16-Rating scale for performance assessment	25	3.8	76	3.9	78	2.5	50	3.4	68	2.3	46
S17-Rating scale for error messages	17	2.9	58	3	60	3.6	72	3.6	72	2.5	50
S18-Ease of readability	18	3.7	74	3.6	72	3.7	74	2.6	52	3.5	70
S19-Satisfaction with text	19	2.4	48	2.4	48	2.4	48	2.3	46	2.5	50
S20-Rating scale for voice assistance	20	2.4	48	2.4	48	2.3	46	2.1	42	2.0	40
S21-Rating scale for attractive screen design	22	2.3	46	2.1	42	2.4	48	2.0	40	2.6	52
S22-Rating scale for interface color	23	2.4	48	2.5	50	3.8	76	4.8	96	4.5	90
S23-Rating scale for icons and buttons	24	3.6	72	3.6	72	3.9	78	4.6	92	3.2	64

Overall, the results indicate that users have similar opinions across all subjective usability metrics for the five mobile apps. However, when comparing the usability of each mobile app, Haki App outperformed the others in navigation, ease of using the virtual keyboard, ease of understanding the output, app loading, task effort, and finding help.

Therefore, the Haki App was more usable for people with disabilities. Furthermore, the results show that users are dissatisfied with feedback provided via the applications, the arrangement of the main menu, response time, the language used, ease of learning to use the applications, text size, font and text color, and screen layout. Assistance with voice and multimedia usage does not provide appropriate feedback to users. Findings show that users are somewhat satisfied with the remaining subjective metrics, except for those related to understanding the general output and the suitability of the application, for which users were highly satisfied.

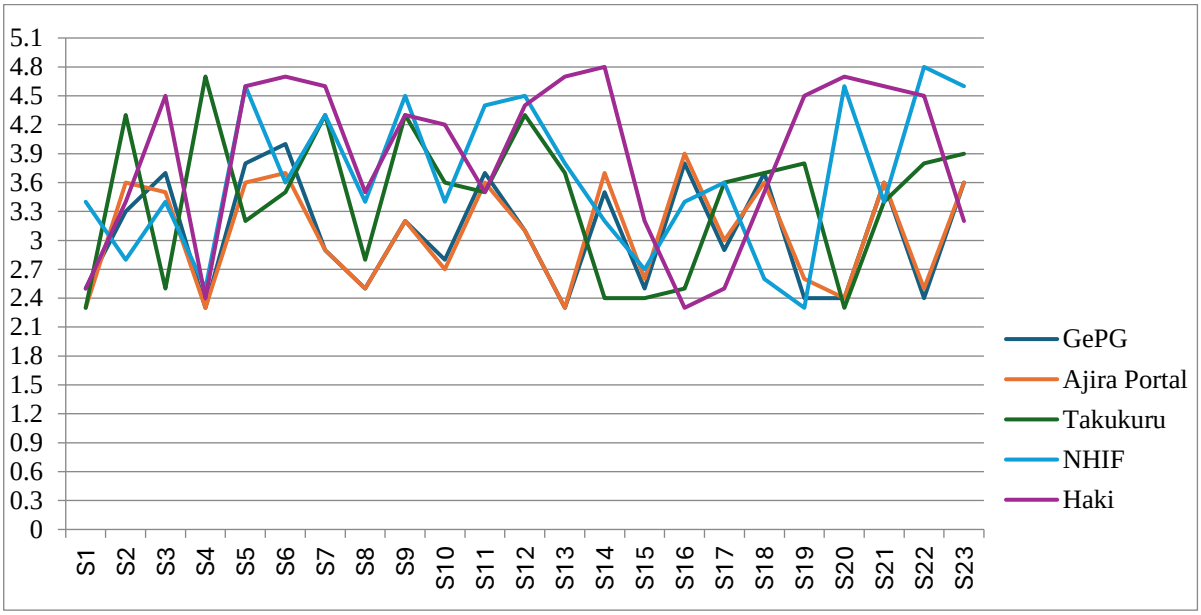

Figure 1: Comparative Analysis for Subjective Results (Metric Scale)

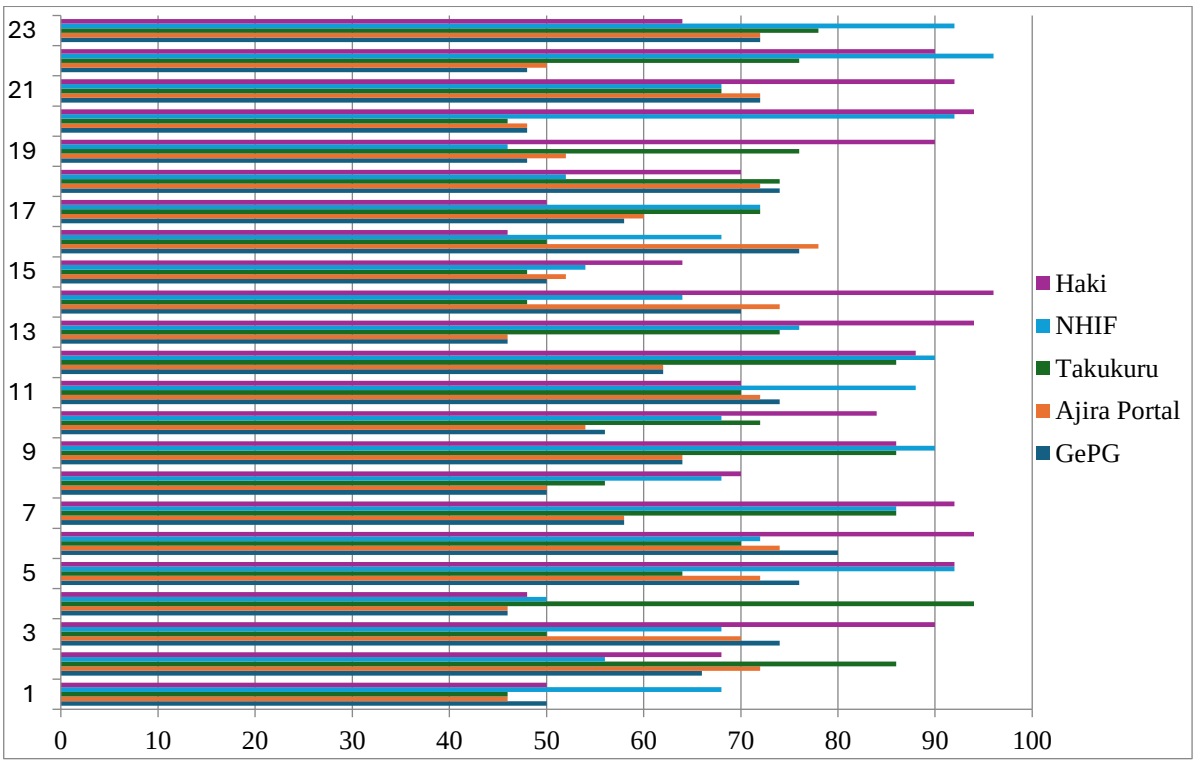

Figure 2: Comparative Analysis for Subjective Results (Percentage)

5. Discussion and Implications

The menu is the primary method for retrieving information in mobile apps (Kim, 2011; Umar et al., 2024) and can significantly affect user satisfaction (Ling et al., 2007). In this study, respondents reported being dissatisfied with the menus of both applications. The critical issue with menus is designing an appropriate menu that enables users to navigate smoothly to the mobile app's intended functionality (Punchoojit & Hongwarittorrn, 2017). Designing menus for mobile apps is more challenging than for desktop apps because menus are constrained by screen space (Punchoojit & Hongwarittorrn, 2017). An effective navigation mechanism could enable users to swiftly and quickly access the desired pages from anywhere in an app (Kapoor & Vij, 2018; Khamaj & Ali, 2024). Therefore, menu designers for mobile apps should always consider screen space limitations when accommodating users with disabilities. The users are also unsatisfied with the feedback the mobile apps give. Meaningful feedback helps users to recognize, diagnose, and recover from errors (Fetaji & Fetaji, 2011), making them more comfortable and increasing the likelihood of user satisfaction with mobile apps. Feedback about user actions can be given in text, voice, or any other form that does not disturb users (Alsos et al., 2012). Therefore, government mobile app designers must ensure that feedback is well articulated in their apps to boost user satisfaction.

Users were also dissatisfied with the mobile apps' response times. Mobile apps are slow, and loading times on mobile devices take a long time, affecting their usability (Hussain & Kutar, 2012). Voice assistance also received poor ratings, indicating their dissatisfaction. Voice assistance allows users to interact with mobile apps using natural language to answer questions and perform actions (Vieira et al., 2022; Zwakman et al., 2020). The voice assistant is crucial for people with disabilities and for those who can speak but cannot type to access mobile apps. The system developers could use Artificial Intelligence (AI) to build AI-based voice assistants, such as Apple Siri and Amazon Alexa, and embed them in government mobile apps.

Further, sluggish response time indicates poor quality of the mobile apps (Chi, 2018; Mogano, 2023), which also needs attention from government mobile developers. All government apps support Kiswahili and English, the main languages used in Tanzania. The users have rated the language's usability on a low scale, indicating dissatisfaction with its appropriateness. For instance, some system responses are provided in English even when users have already switched to Kiswahili. In this situation, if the user doesn't know both languages, they won't understand the feedback returned by the mobile apps. Since language is crucial for the usability of mobile apps (Ayada & Hammad, 2023; Tahir, 2015), developers should work closely with language experts to improve the language used in the government mobile apps.

Further, users are dissatisfied with the text size, spacing and color. Text readability affects the user's cognitive ability to process the information in a message (Lehavy et al., 2011). For instance, small font sizes and spacing could affect users' task completion rates and increase the likelihood of errors, while unfriendly, contrasting colors could make users uncomfortable with mobile apps. For people with visual impairments, text readability is a crucial aspect of usability. Given the significant impact on user satisfaction, it is advisable to ensure that mobile apps are readable before release and they should adhere to guidelines for developing inclusive user interfaces for people with visual impairments (Atata & Odedeyi, 2025; Matraf et al., 2023; Tak, 2022; B. Wang et al., 2016). Other areas in which users are dissatisfied are the interface and screen layout, multimedia usage within the mobile apps, and ease of using the system (learnability). Effective screen designs should be based on the user's mental model instead of the designer's (Martín & Macías, 2023; Wong et al., 2012). This means that the intended users of the apps should validate all design prototypes (including screen designs) to increase usability satisfaction. Voice, images, videos, and animations are the most commonly used multimedia tools in mobile apps. A close observation of the apps indicates that images are the most-used multimedia tool across these five mobile apps.

Limited implementation of these multimedia features could have made users dissatisfied with the mobile apps. Developers should also pay attention to these areas without compromising the loading of mobile app features and response rate. Moreover, mobile apps are not easy to learn, making it difficult to operate without much effort.

Generally, one approach to address the usability of government mobile apps is to deploy Assistive Technology (AT), a tool and strategy that could help people with disabilities overcome barriers to accessing e-services and information (Aprilia & Suwandayani, 2025; Lancioni & Singh, 2014). Using AT to improve access to electronic services and information for people who have difficulty accessing them is considered a significant solution for ensuring equal access to electronic services, information, and opportunities (Lancioni & Singh, 2014). AT, such as screen readers, speech recognition, and text-to-speech conversion software enables people with disabilities to participate in social and economic activities through digital platforms (Brandt et al., 2020; Wang & Wu, 2021). Previous studies have shown that incorporating assistive technologies into digital services reduces barriers and challenges associated with usability and access to electronic services (Agangiba et al., 2018; Davids et al., 2017; Mishra et al., 2024; Monden et al., 2024).

Moreover, when people with disabilities rate the Haki App's usability significantly higher than other mobile platforms, it suggests the app successfully integrates universal design principles. Further, the finding suggests that the developers likely engaged users with disabilities during app development, particularly in requirements gathering and testing. However, this finding also reveals a lack of standardization in mobile app development across institutions.

6. Conclusion, Limitations and Future Studies

This study has investigated the usability of the selected Government mobile apps, such as GePG, Ajira Portal, Takukuru, NHIF and Haki. Overall results indicate that users were slightly satisfied with the mobility apps (mean score ♎ of 3.1 for both apps). Further, the results suggest that eight (9) areas across the selected apps need special attention. These areas are inappropriate feedback, menus, response time, inappropriate language, ease of learning, text size and color, screen layout, interface layout and multimedia usage. This means that developers of Government mobile apps need to put more effort into making sure that the usability of these subjective metrics that received low ratings is well accommodated in these mobile apps to increase user satisfaction and loyalty in using the apps to access services, which can also be accessed through other privately owned mobile apps. Examples of services accessed through government and privately owned mobile apps include paying for utilities such as water and electricity, land taxes, and fines, to mention a few. Additionally, the developers should ensure to adhere to the universal design principles (Kurek et al., 2024; Sanderson et al., 2022; Szentirmai & Murano, 2023). To the best of the researchers' knowledge, this study is the first major effort to evaluate government mobile apps in Tanzania. Hence, it allows developers of government mobile apps to review and improve them based on users' feedback. The latest effort at usability evaluation of government information systems was done on government websites (Elisa, 2017; Mtebe & Kondoro, 2017; Said, 2015).

This study is without limitations. First, the study employed only subjective measures to evaluate the government mobile apps for reasons indicated in the research methodology section. Using both subjective and objective measures could provide a holistic view of how users perform specific tasks in experimental settings and of their perceptions of the mobile app, as reported in the questionnaire. However, using only subjective measures is still valid and acceptable in system usability evaluations. Second, purposive sampling was used during sample selection, which may introduce potential bias and affect the generalizability of the findings.

Future studies may apply a probabilistic sampling approach to ensure sample representativeness and generalizability of the findings. Third, demographics indicate that the participants were mostly male (80%) and young (73% aged 18–34). This does not accurately reflect Tanzania's broader disability demographics, which increase significantly with age. Therefore, future studies may consider using a sampling procedure that addresses demographic representation to improve the generalizability of the findings.

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