International Journal of Computer (IJC)
ISSN 2307-4523 (Print & Online)
https://ijcjournal.org/index.php/InternationalJournalOfComputer/index

Analysis of the Requirements for a Web-Based Forum Among Donors, Vendors, and Consumers of Assistive Technologies in Tanzania

Josephine C. Ngonyani[a*], Juliana S. Kamaghe[b]

[a]*Department of Information and Communication Technology, Tanzania Public Service College, Tanga, Tanzania.*

[b]*Department of Mathematics and Information and Communication Technology, The Open University of Tanzania, Da- es-Salaam, Tanzania.*

[a]*E-mail:josephinecn17@gmail.com,* [b]*Email: juliana.kamaghe@out.ac.tz*

Abstract

Sharing information related to Assistive technology (AT) is the only reliable approach to narrowing the gap in AT accessibility. In the modern world of telecommunication, the application of the internet was expected to fill in the gap but the gap persists. With all the effort made by world forums, it was anticipated to have no more problems related to AT accessibility, and cost. This study, therefore, analysed the requirement needed for the development of a reliable web-based forum that could provide a consistent linkage between AT consumers, donors, and vendors for ease AT accessibility at affordable cost in Tanzania. The study was qualitative and employed questionnaires, observation, and interview methods to collect data from a total of 207 respondents who were purposefully selected, of whom 200 were AT consumers, 5 AT donors, and 2 vendors. Microsoft forms were used to analyze data and the presentation was done descriptively. The study disclosed nine requirements for the development of a web-based forum including location, product description, means of payment and goods transportation, time of delivering goods, types of disability, kind and quantity of AT, means of payment, and price. Having all that information centred at one site will ensure a constant availability of AT and AT accessibility information among donors, vendors and consumers of AT in Tanzania.

Keywords: Requirements of a web-based forum; Donors; Vendors; Consumers; Assistive technologies; Tanzania.

Received: 4/23/2023
Accepted: 5/11/2023
Published: 5/30/2023

---

* Corresponding author.

1. Introduction

The Internet and related technologies have the potential to significantly improve the lives of Persons with disability (PWD) through empowerment, information access, and social inclusion by broadening the range of activities available to them [1, 2]. It is a request that each member nation to creates an information structure on the accessibility and availability of AT and services that are connected in their particular setting[3]. The usage of the internet is anticipated to improve accessibility to AT and make it available to many AT users in Tanzania, which will facilitate the spreading of awareness among AT stakeholders. Based on its larger reach, ease of sharing among users through search engines, and accessibility through various platforms including computers and phones, the Internet is the most trustworthy means to connect donors, vendors, and AT consumers[4]. The European Assistive Technology Information Network (EASTIN), for instance, is an extensive network that offers thorough information about AT and their technical specifications to end-users of AT, their families, professionals in the health and social services industry, AT manufacturers and suppliers, researchers, and agencies involved in AT provision[4]. A web-based simulation provides many advantages over conventional systems, such as improved cooperation, increased accessibility, versioning, controlled access, and ease of customization, maintenance, and use [5]. Although there are still issues with access to AT devices and a lack of knowledge about where to get them, poverty still makes disadvantaged communities in Tanzania unable to access AT devices [6, 7]. This study aimed to collect requirements for the development of an interactive web-based forum for reliable linkage among donors, vendors and consumers of AT. Taking advantage of Tanzania's high rate of adoption of smartphones and other portable telecommunication devices, the web-based forum is anticipated to be dependable for all AT stakeholders to rely upon for search of AT-related information, specifically on availability, reliability, type of rehabilitation service they provide, price of the devices for vendors, and how users can reach them (accessibility).

1.1 Terms definitions

1.1.2 Web-based forum

A web forum is an online setting where members of a given community can discuss issues that are important to that community with only minimal social constraints [8]. Web forums are effective and popular tools that enable members to inform and update others about the program of the group and draw in new supporters. In this study, a web-based forum will be utilized to link and facilitate access to information about AT among Tanzanian donors, vendors, and AT consumers.

1.1.3 Donors

A donor is a person, a group, or a nonprofit organization that is dedicated to a significant issue. In the context of this study, AT donors will make it possible for PWD to obtain assistive products and services for all of their functional needs at one location without collecting a fee [1].

1.1.4 Vendors

A vendor is a person or organization that charges clients for the goods and services they purchase. According to [9], retailers who purchase AT products from whole sellers and whole sellers who always purchase AT products from manufacturers are included among the vendors of AT, The bulk retailers of AT are typically found in large cities and towns in developing nations [9].

1.1.5 Consumers

Any person or group that orders anticipates ordering, or utilizes acquired goods, products, or services primarily for personal, communal, familial, domestic, and related needs is referred to as a consumer. Other persons without disabilities appear to gain from AT in this study, in addition to PWD who are its primary users, including employers, trainers, family members, and anybody else who interacts with PWD in any manner [10].

1.1.6 Assistive technologies

According to the World Health Organization [3,11], assistive technology is any hardware or software that aims to increase a person's freedom and functionality, hence enhancing their well-being and preventing disability, other secondary health issues, the need for long-term care, and a financial load on their careers. According to [11], each of its member nations must have a strong framework or procedure in place to guarantee that these devices are always available and easily accessible to PWD.

1.2 Requirements for a web-based forum for donors vendors and consumers of AT

The identification of stakeholders, and their demands, and documenting them in a way that allows for communication, analysis, and execution are all crucial steps in determining and assessing the software's purpose [12]. It contains justifications for the services a system ought to provide as well as restrictions on how it can operate [12]. Never forget that requirement link problems and fixes. If the scope of the system is established, preparing the activities in the proper direction at an early stage will be the focus as the solution design depends on how competent and accurate the problem is [13]. The requirements phase is crucial since it provides a solution to the question "What the system is aimed for?" [14].

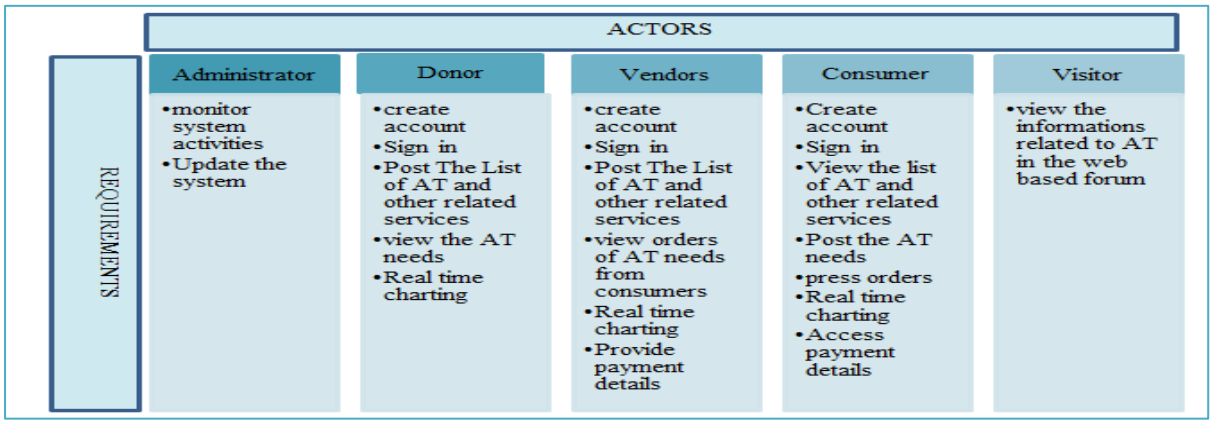

Figure 1: Functional requirements.

Source: field research data, (2022)

The feasibility study, requirement discovery (elicitation and analysis), specification, and validation are the four key activities included in the requirement analysis process [13]. This study concentrated on requirement discovery and specification. A variety of elicitation techniques, such as interviews, questionnaires, observations, and literature reviews, were utilized to identify the need for a reliable web-based forum for Tanzanian AT donors, vendors, and consumers. Additionally, stakeholders actively participated to make sure that all necessary needs were acquired. Despite other techniques like interviews, questionnaires, observation, and literature review, active stakeholder involvement is crucial [15].

1.2.1 Requirement specification

According to [12], all user and system requirements must be documented in a way that makes them simple to comprehend, clear, comprehensive, unambiguous, and consistent. Functional requirements are defined as what the system will provide and how it responds to certain inputs; whereas non-functional requirements are restrictions on the functions the system should be able to perform [12]. Figure 1 and Figure 2 show the requirements for a web-based forum.

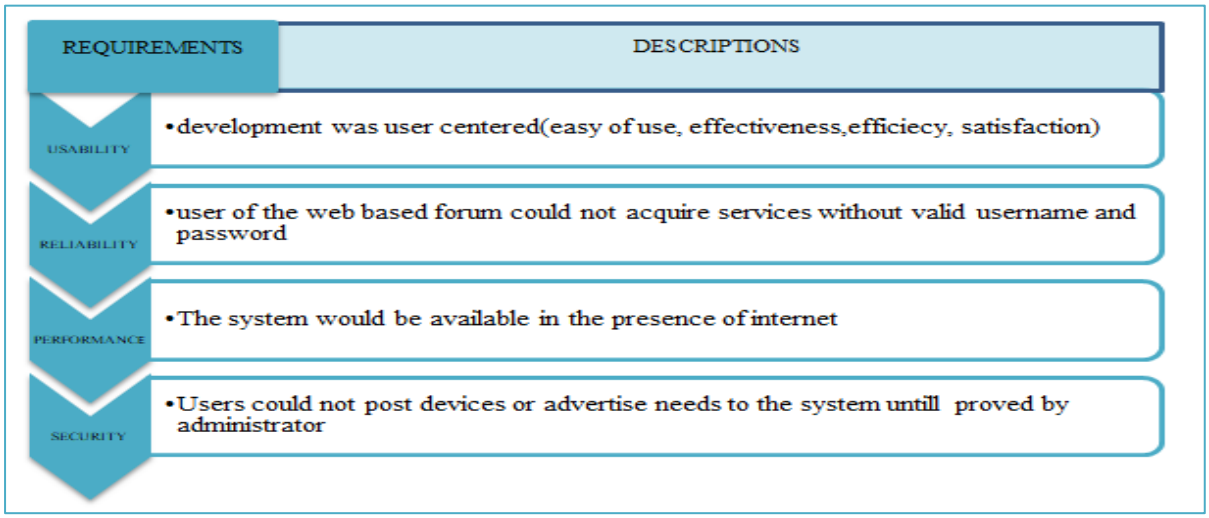

Figure 2: Non-functional requirements**.**

Source: Field research data, (2022)

2. Methodology

2.1 Design

Since the researcher was interested in "what," "how," and "why," a qualitative methodology was adopted for the investigation. When fewer people are required to understand human perceptions, behaviours, and altitudes, the method works well and gives the researcher more process control [16].

2.2 Study area

The research was conducted in the Dar-es-Salaam city council. The location was chosen due to the high number of vendors and donation centres.

2.3 Participants

The respondents were chosen based on their knowledge of AT-related issues. They were therefore seen as having a wealth of information [17]. A total of 116 men and 91 women were chosen through the technique of purposeful sampling to create 207 respondents including 5 AT donors, 2 AT vendors, and 200 consumers. The AT consumers include PWD centres and institutions that support PWD, families with PWD members, and anybody who interacts with PWD in any way. Thus, five PWD service centres were among the 200 AT consumers visited by a researcher.

2.4 Materials

Qualitative data concerning the AT accessibility information and requirements needed for the development of a web-based forum for easy availability and accessibility of AT among donors, vendors, and consumers of AT was gathered by using a structured questionnaire. The questions were coded to Microsoft Form, an online tool to enhance mobile data collection whereby signing in to Microsoft, creating the form, sharing the form and previewing results were the steps involved. The form link was shared among mobile devices of the vendors, consumers and donors of AT. The interview was used to gather information through verbal exchange and qualified information was gathered during the survey through observation whereby a researcher visited the real environment of real users and observed the process of acquiring AT for donors vendors, and consumers of AT in the selected areas. The approach provided the opportunity to discover how the AT was obtained, sold, and donated, which also added value in designing the web-based forum.

2.5 Data analysis

For online mobile data collecting and later offline analysis, survey data was coded to Microsoft Forms. Analytics was built into the forms to evaluate responses and then moved to Excel for additional analysis or ranking. On the other hand, the qualitative interview data were organized according to the research questions and then presented in a clear and informative way using charts and tables.

3. Results

3.1 Demographic characteristics

In total, 207 respondents took part in the study; 116 (56%) men and 91 (44%) women, including 200 (97%) AT consumers, five (2%) AT donors, and two (1%) AT vendors. Regarding the number of years respondents had been involved with AT, 59% of respondents had used AT for more than 10 years, while 60% and 100%, respectively, had served as AT donors and vendors for more than 10 years. In terms of internet access and

devices used, 95% of respondents had access to the Internet, 78% of respondents utilized smartphones, and 82.8% had regular access to the Internet. The internet applications mostly preferred was WhatsApp(73%), email(68%) and Facebook(48%). Google was most(73%) mentioned as a method used by consumers to search AT information whereby the location of products was the most found by 90.5%, other 'find' information such as price(70%) and type of AT (59.5%) was also included. Furthermore, data on knowledge of information systems shows that 73% knew while 27% had none. Respondents have posed the question to see whether they could relate the concepts of the system they were familiar with and to awaken them so they could contribute concepts that would aid in the creation of a reliable web forum.

3.2 Kind of Information System they need

Ninety-nine per cent of respondents agreed to have an information system that could enable them to access AT information and place orders. Any web-based system that is being developed starts with the requirements of the users, hence respondents proposed the requirements for the development of a reliable web-based forum as discussed in the following sections.

3.2.1 Consumers' Requirements

A system that would allow them to get location was highlighted by the majority of respondents (88.5%), while 82.5% needed price information and 82% wanted a system that could help them promote their AT needs. See Figure 3.

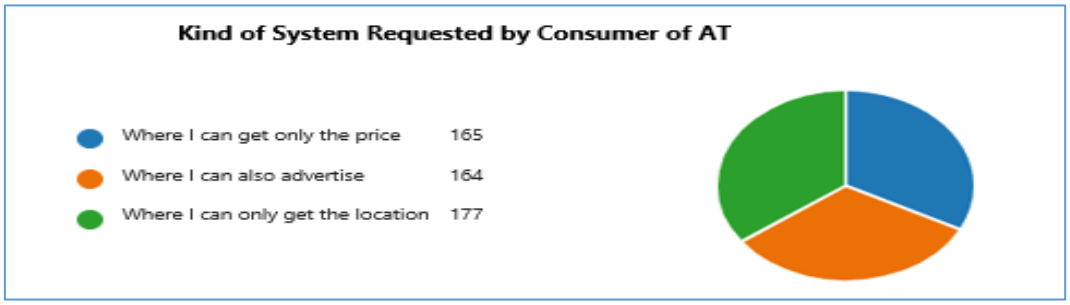

Figure 3: Consumer requirements.

Source: Field research data, (2023)

Figure 4 displays a total of nine consumer-required pieces of information: product user manual (87.5%), AT product location (80.5%), payment methods (76%) and delivery methods (71%) as well as prices (49%) and disability types (48%), AT product type (46%) and AT quantity (12.5%). These details would make it possible for customers to readily purchase AT and other assistive items at lower prices.

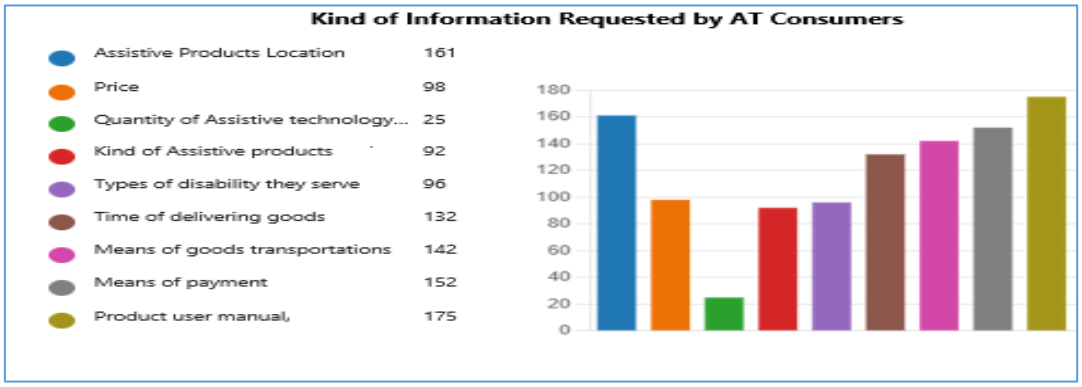

Figure 4: Consumer information requirements.

Source: Field research data, (2023)

3.2.2 Vendors' Requirements

The vendors asked for a system that would let them access the list of required AT, advertise their products, and get the list of needs. See Figure 5. They would be able to identify the products that people prefer in this way.

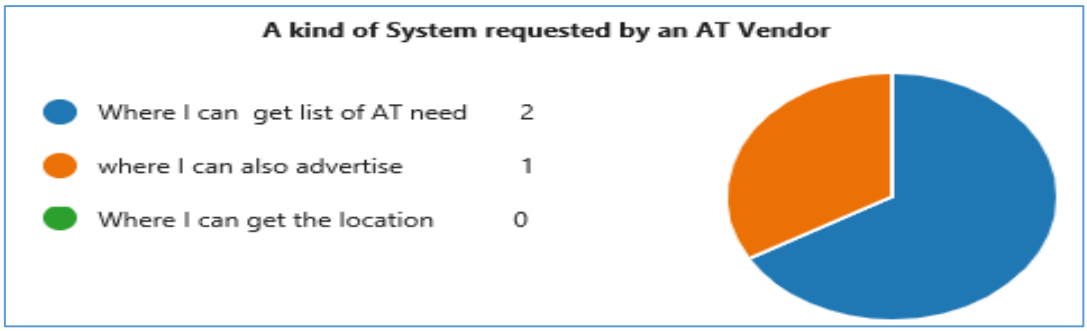

Figure 5: Vendor requirements**.**

Source: Field research data, (2023)

On the other hand, six requirements including price, quantity of AT, kind of disability, type of AT, and payment method were listed by every vendor (100%) in the survey. Additionally, 50% of responders mentioned the PWD location. Figure 6 describes the findings.

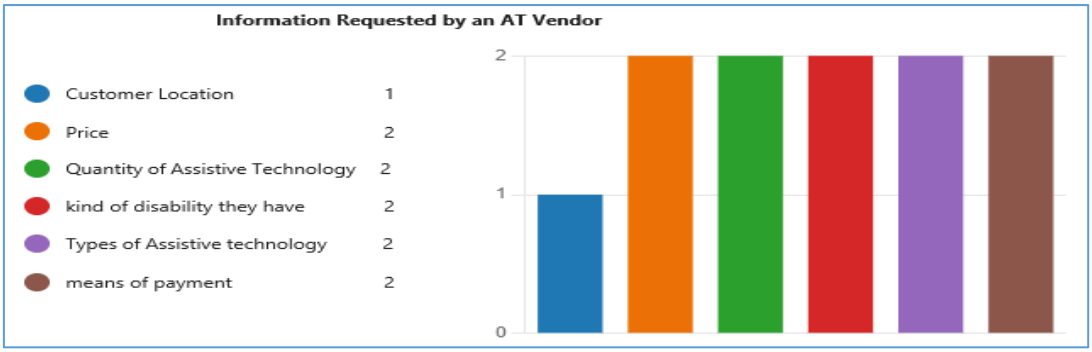

Figure 6: Vendor information requirements.

Source: Field research data, (2023)

3.2.3 Donors' Requirements

The majority of respondents recommended the existence of an AT accessibility system where they could obtain diverse accessibility information, including details on the AT needs, where PWD were located, and where they could market their services. The results of this analysis are shown in Figure 7.

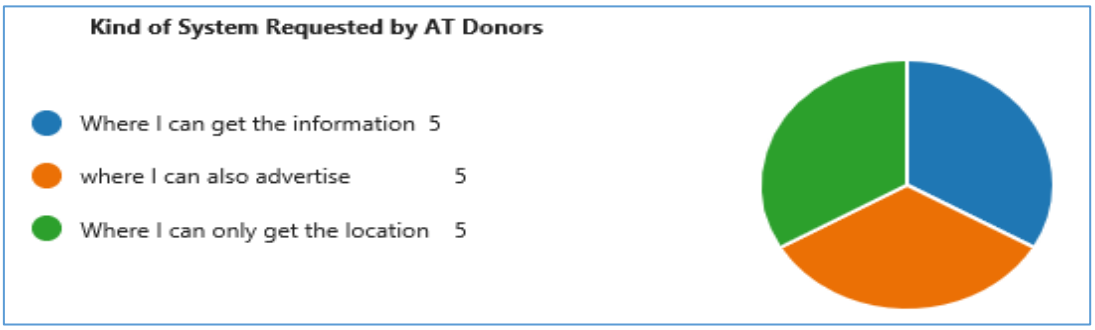

Figure 7: Donors' requirements.

Source: Field research data, (2023)

Donors did, however, list four requirements. The majority (60%) of respondents noted the number of AT products that consumers needed, while all (100%) indicated they needed information on the location of consumers, their type of disability, and the kind of AT products needed; Look at Figure 8.

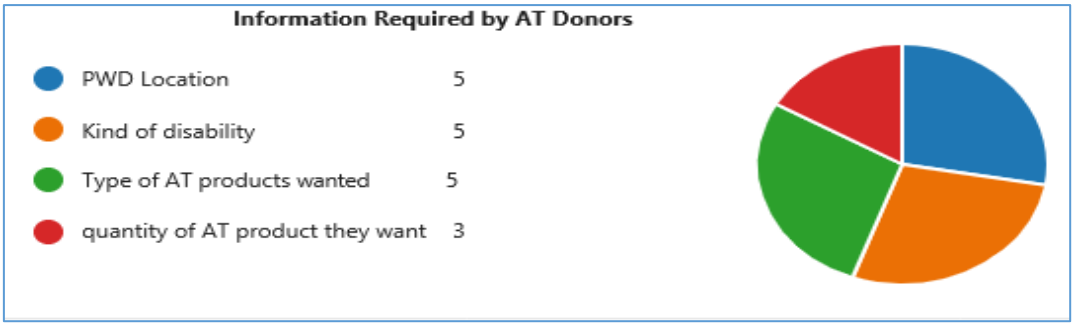

Figure 8: Donors' information requirements**.**

Source: Field research data, (2023)

4. Discussion

The results demonstrate that most of the respondents had sufficient experience in matters relating to AT because they have used or worked in AT-related matters for more than 10 years. Many people access the internet on their smartphones. According to [18] and [19], a large number of Tanzanians, access the internet using their mobile phones. Facebook, email, Google, and YouTube are the most frequently utilized applications the point which is also supported by the Tanzania Telecommunication Authority (TCRA) communication statistics report for the year 2022/2023. This evidence supports the presence of the large number of users who are familiar with the internet and its applications which is a basic requirement for the implementation of the study

The consumer asks for nine requirements, including the product user manual, location, payment methods, modes of goods transportation, the time it takes to deliver the goods, the price, various kinds of disabilities, and the kind and quantity of AT. Four demands have been highlighted by donors to reach more PWD, including the consumers' location, their type of impairment, and the number of AT items they need. Vendors, on the other hand, require a system that will enable them to access six data points, including the location of PWD, price, the amount and type of AT, the type of disability, and the payment method. [20] claimed that an effective digital system allows people to approach by grasping their interests. Additionally, users have the option of recommending preferences and levels of satisfaction that haven't yet been attained [20].

This study has a greater impact on increasing the body of knowledge on all matters concerning the accessibility of AT and other related information and proposes a centralized environment that enables the stakeholders of AT including consumers, vendors, donors, and other implementing partners to harmonize their activities related to AT accessibility at one site. [13], suggests the presence of a centralized system or model in every country that will enable a constant environment for AT accessibility among the PWD.

5. Conclusion

The study aimed at analyzing the requirement of a web-based forum for reliable linkage among donors, vendors and consumers of AT in Tanzania. The study uncovered a total of nine requirements for the development of a

web-based forum including location, product descriptions, means of payment and goods transportation, time of delivering goods, types of disability, kind and quantity of AT, means of payment and price. Combining all of that information in one place could guarantee that donors, vendors, and AT users in Tanzania consistently have access to AT and AT accessibility information.

References

[1] WHO. (2018a). Improving Access to Assistive Technology: Report by the Director-General of 15th March 2018.

[2] CIPESA. (2021). Assessing the Barriers to Accessing ICT by People with Disability in Tanzania.

[3] WHO. (2016). Priority Assistive Products List: Improving access to assistive technology for everyone, everywhere.

[4] EASTIN, (2013). European Assistive Technology Information Network: Strategy paper 2014-2016.Available at: *www.eastin.eu*

[5] Byrne, J., Heavey, C., Byrne, P. J. (2010). "Simulation Modelling Practice and Theory A Review of Web-Based Simulation and Supporting Tools." *Simulation Modelling Practice and Theory* 18(3): 253–76. http://dx.doi.org/10.1016/j.simpat.2009.09.013.

[6] African Initiatives. (2018). *Disability Needs Assessment and Situation Analysis Monduli and Longido Districts, Arusha Region Moshi Rural and Urban Districts, Kilimanjaro Region*. African Initiatives.

[7] IDS. (2020). Disability Inclusive Development, *Tanzania Situational Analysis, June 2020 update*. Inclusive Futures. *Promoting Disability Inclusion*: Institute of Development Studies.

[8] Holtz, P., Kronberger, N., & Wagner, W. (2012). Analyzing Internet forums: A practical guide. *Journal of Media Psychology*, 24(2), 55-66. doi: 10.1027/1864-1105/a000062

[9] Layton N, Borg J, (2019). Global perspectives on assistive technology: proceedings of the GReAT Consultation 2019, World Health Organization, Geneva, Switzerland, 22–23 August 2019. Volume 2. Geneva: World Health Organization; 2019. Licence: CC BY-NC-SA 3.0 IGO.

[10] Shriver, K. E. (2018). How does rehabilitative technology benefit people with disabilities? Available at: https://www.nichd.nih.gov/health/topics/rehabtech/conditioninfo/help, Accessed on 10th April 2022.

[11] WHO. (2018b). Resolution WHA71.8. Improving access to assistive technology. In: Seventy-first World Health Assembly, Geneva, 21–26 May 2018. Resolutions and decisions, annexes. Geneva: World Health Organization; 2018 (WHA71/2018/REC/1; http://apps.who.int/gb/or/e/e_ wha71r1.html, accessed 16 November 2022)

[12] Schneider, G. P., Ph, D., & Shipp, L. (2010). Software Engineering (Ninth Edit). https://doi.org/10.1136/bmj.1.5802.756-b

[13] Dey, S., & Lee, S. W. (2017). REASSURE: Requirements elicitation for adaptive sociotechnical systems using repertory grid. *Information and Software Technology*, 87, 160–179. https://doi.org/10.1016/j.infsof.2017.03.004

[14] Al-salem, L. S. (2007). Eliciting Web application requirements – an industrial case study, 80,294–313. https://doi.org/10.1016/j.jss.2006.05.005

[15] Sadiq, M. (2010). Modelling the Non-functional Requirements in the Context of Usability, Performance, Safety and Security, (March), 73.

[16] Bricki, N., & Green, J. (2007). *A Guide to Using Qualitative Research Methodology*. Medecins Sans Frontieres, 11–13. https://doi.org/10.1109/PROC.1978.11033

[17] Creswell, J. W., Plano Clark, V. L. (2011). *Designing and conducting mixed-method research*. 2nd Edition, Sage Publications, Los Angeles

[18] Kamaghe, J., Luhanga, E., Michael, K. F. (2020). The Challenges of Adopting M-learning Assistive Technologies for Visually Impaired Learners in Higher Learning Institutions in Tanzania. *International journal of emerging technologies in learning (iJET) 15*(1): 140-151.

[19] TCRA. (2022). Tanzania Communication Regulatory Authority. Sector Performance Report For 1st Quarter 2022. A Report for a Quarter ending September 2022. Available at: https://www.tcra.go.tz/uploads/text-ditor/files/1st%20Quarter%20Statisctics%20Report%20for%202022-Fin%20Rev_1666673317.pdf Retrieved March 17, 2023.

[20] Togawa, T., Sato, T., & Saito, J. (2017). Media Processing Technologies for Affective Digital Marketing. *FUJITSU Scientific Journal, 53(5), 38-46.* https://doi.org/https://www.fujitsu.com/global/documents/about/resources/publications/fstj/archives/vol53-5/paper07.pdf