

Characteristics and factors that discriminate Internet users from non-user information seekers: the case of rural women in Tanzania

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Abstract: The study determined the information needs and information-seeking patterns of rural women living in communities surrounding telecentres in Tanzania. The study used a questionnaire survey to collect data from users and non-users of Internet in three rural districts in Tanzania that have telecentres: Sengerema, Kongwa and Kilosa districts. The study findings showed that information needs of both users and non-users were location-specific. Although there were similarities in the major information needs and information-seeking patterns of both users and non-users of Internet, some variations were noted. Education level, income and number of information sources used played a key role in discriminating users and non-users in online information seeking. The study recommends that telecentres should conduct regular user studies, create awareness, disseminate information in local languages and multiple formats, collaborate with other local stakeholders, and provide educational programmes and information services relevant to socio-economic activities of the communities.

Keywords: information behaviour, online information-seeking behaviour, Internet users, rural women, Tanzania

1. Introduction

Within the context of development, Information and Communication Technologies (ICTs) have created new economic and social opportunities across the world. In developing countries, access to ICTs and especially Internet is increasing, due to advancements of mobile phone technologies and establishments of community-based ICT initiatives in the form of telecentres. Internet enhances access to information that is context-specific, delivered timeously, which can enable disadvantaged groups such as women to communicate, network, collaborate, raise their concerns about discriminatory laws and unjust actions at local levels, and to participate in civic, social, political, and economic processes that are essential to achieving change [1–3].

The use of Internet, however, continues to be controlled by the existing power relations in the communities, whereby women are regularly disadvantaged in terms of access and use of these technologies. Gender digital divide is prevalent worldwide. A review of empirical research on the impacts of public access to ICTs also revealed that telecentre users are primarily young males with relatively high socio-economic status and prior access to the Internet [4]. This finding holds both for Asia [5] and Africa [6]. The gender digital divide is predominant in less-developed countries. In 2013, it was estimated that there were 16% fewer women than men using the Internet in less-developed countries, while, there were only 2% fewer women than men who use the Internet in developed countries [7]. This gender digital divide is largely attributed to a

wide range of technical, socio-economic and political factors, and attitudes and cultural beliefs [8, 9]. Enhancing access to ICTs among women can improve GDP. It is estimated that increasing access to Internet to 600 million additional women and girls can improve global GDP by up to US\$13 billion to US\$18 billion [10]. Increased access and usage of Internet by women and the better understanding about their information needs and importance of Internet, can help women learn about, and be empowered to respond to, development challenges.

Previous research in developing countries indicates that information needs of rural people are not sufficiently met and Internet technologies are yet to be fully utilised by the rural people, especially women in Sub-Saharan Africa, to access relevant information [11–14]. A study of four telecentres in Tanzania revealed that major information needs of rural people were related to business and agricultural information. At the same time, however, there was limited access to this information through telecentres [14]. Rural people relied on face-to-face communication and radio as their major sources of information [14]. Similar findings were reported by other studies, that information needs and information-seeking patterns of rural people are location-specific, and face-to-face communication remains as the main source of information, despite the existence of telecentres and mobile phones. Examples of such studies include a study of six telecentres in Tanzania [12], a study from the Indian Himalayan region [11] and a meta-analysis of rural information and communication services in Tanzania [13]. Access to Internet technology through telecentres and mobile phones is growing in many developing countries including Tanzania. However, it is not yet clear to what extent telecentres and advancements of mobile phone technologies have enabled rural women to fulfill their information needs.

2. Objectives

There is a paucity of clear empirical evidence on the nexus between ICTs, gender information-seeking behaviour, and factors that discriminate between users and non-users of Internet, as the few available studies have not yielded sufficient evidence to comprehensively understand the subject. The purpose of this study was to determine the information needs and information-seeking patterns of the rural women living in communities surrounding telecentres in Tanzania. The research was based in three rural districts in Tanzania that have telecentres: the Sengerema, Kongwa and Kilosa districts.

3. Methodology

The study was carried out in three selected districts which have a presence of ICT such as telecentres and telecommunication signals in Tanzania. Three rural districts surrounding the telecentres were selected, which were Kongwa, Sengerema and Kilosa. The study used a multi-case study research design. The survey questionnaires were used to collect data from users and non-users of Internet from telecentres and mobile phones. The sample of the study was 90 users and 90 non-users – a total of 180.

Questionnaires were given to internet users, who visited the telecentres during a two-week data- collection period in each of the three telecentres between June and August, 2015. Case quota sampling was used to select the sample for non-users of Internet from telecentres and mobile phones. Quota sampling method was used because it was not possible to get a list of households and participants in advance; there was a limited budget and financial constraints; and, according to [15], Tanzania does not have a systematic arrangement of habitation. Thus, it was

impossible to sample households, especially non-users of Internet, by using a simple random approach. The non-users were identified in consultation with the telecentre management and community leaders. The sample for non-users comprised 90.

The researchers personally administered the questionnaires. Relevant research permits were obtained before the commencement of data collection. Approval to conduct this study was sought from and granted by the Muhimbili University of Health and Allied Sciences (MUHAS) Ethical Review Board in Tanzania. An informed consent form was also used to facilitate voluntary participation in the study. The questionnaire surveys were pre-tested in Bagamoyo district, Tanzania, before their application. A convenience sample of fifteen female ICT users and fifteen female non-users was selected. Results from the pre-tested data were used to refine the data collection tools. The survey questions for the questionnaires were developed based on existing, tested and verified instruments [14].

Data were analysed with the Statistical Package for the Social Sciences, version 18. A descriptive analysis of the sample was performed. Pearson's χ^2 test was used to examine whether differences existed between the information needs of the Internet users and non-users in terms of the location variables. The statistical significance was p-value, 0.05. Binary logistic regression analyses were also performed to examine demographic factors that discriminate information-seeking patterns of Internet users and non-users. The dependent variable assessed whether (1) or not (0) rural women had sought information through the Internet. The demographic characteristics were included as independent variables, including age, education, income level, occupation, location and information sources used. The main occupation variable was coded from 1 to 6: no job, farmer, small business, government employee, employed by NGO/private organisation and student. The income level variable was measured from 1 to 6: below 50,000 TShs (US\$25); 50,001 – 100,000 TShs (US\$25 – US\$50); 100,001 to 300,000 TShs (US\$51 – US\$150); 300,001 – 600,000 TShs (US\$151 – US\$300); 600,001 – 1,000,000 TShs (US\$301 – US\$500); and 1,000,001 TShs (US\$501) and above. Education level was coded from 1 to 6: no formal education, primary, ordinary-level secondary education, high-level secondary education, post-secondary education at college level and university education. The respondents' locations were Kongwa, Sengerema and Kilosa districts.

Variable on information sources used was measured by assessing the sources/channels of information that are commonly used to access users and non-users of the Internet. These included questions that asked respondents to rate the importance of the information sources using a four-point Likert scale (1 – not important at all to 4 – very important). The following 15 information sources were rated by the respondents: personal experience, mobile phones, family members or friends, radio programmes, Internet, television programmes, print books, print newspapers or magazines, leaders in my ward/street/village, librarians, government officers, formal and informal groups, religious bodies (e.g., church, mosque), NGOs, and posted letters. Individual percentage scores were added up and the total score represented the information sources used variable.

4. Case description

This study assessed the information needs and information-seeking behaviour of rural women in the three communities surrounding telecentres. The telecentres were selected based on the

following criteria: (i) operate in rural areas; (ii) offer a variety of services including Internet and email services, printing and photocopying; community radio and computer training were considered added advantages; (iii) should have been in operation for more than 12 months; (iv) should have various modes of ownership/operation, e.g., privately-owned, government-owned, NGO-owned or community-owned. The same criteria had been used in previous studies in Tanzania [14, 16]. Their selected telecentres had been Sengerema, Kilosa and Songa Mbele Maarifa.

Sengerema Telecentre is located in Sengerema district, a semi-rural district in Mwanza region. It was established by the government in 2001 in partnership with various international partners. It has 25 computers, four printers, two scanners and a website. It offers the following services: Internet, Secretarial services, ICT training, community radio and television, information services, renting a room for conferences, photo studio and air-ticket booking. Kilosa Rural Services and Electronic Communication (KIRSEC) is located in a rural district, namely, Kilosa District, Morogoro region. It is a for-profit business established in 2000 by Robinson Cooperate Corporation (RCC). It has 10 computers, three printers, a photocopier and a scanner and website. The centre was established to improve market linkage between farmers in Kilosa District and outside Kilosa. It offers the following services: information services, mobile money service, electronic postbox, micro-finance, Internet facilities, computer training, Internet connection services to other institutions and a spoken-English course. Songa Mbele Maarifa Centre is located in a rural area, namely Kongwa District, Dodoma region. It was established by ALIN NGO in collaboration with DONNET in 2012. The centre was established to enable famers to have access to ICTs to improve their farming activities. The centre has five computers, a printer, a blog (songambelemaarifacentre blog) and wind and solar power backup, and it offers the following services: library services, Internet, secretarial services, ICT training and information services.

5. Results

The average age of both users and non-users was 25 years, as shown in Table 1. Less than half of the Internet users (42.2%, n=38) had acquired ordinary secondary school education while 37.8% (n=34) had post-secondary education at college level. About 22.2% (n=20) had no jobs, while 20% (n=18) were involved with small businesses. About 28.4% (n=21) of the respondents had an income less than 50,000 TShs or US\$25. For non-users, about 44.4% (n=40) of the study participants had primary education, while one third of the respondents had primary education (37.8%, n=34) had post- secondary education at college level. Less than half of the respondents were engaged with small business (43.8%, n=39) and farming (23.6%, n=21), and they had income of less than 50,000 TShs or US\$25.

Table 1: Profile of respondents

		Users		Non-users	
		Number	Percentage	Number	Percentage
Age	18 - 25 years	52	57.80%	58	64.40%
	26-35 years	27	30.00%	20	22.20%
	36 - 45 years	10	11.10%	7	7.80%
	46-55 years	1	1.10%	4	4.40%
	56 years and above	0	0.00%	1	1.10%
Highest education level	No formal education	0	0.00%	5	5.60%
	Primary	7	7.80%	40	44.40%
	Ordinary level secondary education	38	42.20%	34	37.80%
	High level secondary education	3	3.30%	2	2.20%
	Post-secondary education at college level	34	37.80%	7	7.80%
Main occupation	University education	8	8.90%	2	2.20%
	No job	20	22.20%	13	14.60%
	Farmer	12	13.30%	21	23.60%
	Small business	18	20.00%	39	43.80%
	Government employee	17	18.90%	2	2.20%
Semi-annual income level	Employed by NGOs/private organisation	9	10.00%	8	9.00%
	Student	14	15.60%	6	6.70%
	Below 50,000	21	28.40%	24	31.20%
	50,001– 100,000	9	12.20%	19	24.70%
	100,001– 300 000	5	6.80%	14	18.20%
Location	300,001 – 600,000	14	18.90%	8	10.40%
	600,001 – 1,000,000	12	16.20%	10	13.00%
	Above 1, 000, 001	13	17.60%	2	2.60%
	Sengerema district	30	33.3	30	33.3
	Kongwa district	30	33.3	30	33.3
	Kilosa district	30	33.3	30	33.3
	Total respondents	90		90	

On access to electrical power, 68.2% (n=58) Internet users and 57.1% (n=48) non-users had access to electrical power from public sources. All Internet users (n=90) and a majority of non-users (94.4%, n=85) owned at least one type of ICT. Further, ordinary mobile phones were the major ICT owned by both users (86.7%, n=78) and non-users (77.6%, n=66), which was followed by radio, as shown in Table 2.

Table 2: Ownership of ICTs

Categories	Users		Non-users	
	Number	Percentage	Number	Percentage
Laptop	16	17.80%	3	3.50%
Computer	9	10.00%	5	5.90%
Radio	55	61.10%	52	61.20%
Smartphone	46	51.10%	16	18.80%
Ordinary mobile phone	78	86.70%	66	77.60%
Landline phone	1	1.10%	-	-
Tablet	2	2.20%	-	-
Television	32	35.60%	19	22.40%

Information needs

The findings showed that major information needs of both users and non-users were related to information on health issues, as shown in Table 3. For users, second-most-ranked information needs were related to information on education matters, which was followed by information on job opportunities, and legal and human rights. For non-users, other major information needs were related to information on business and entrepreneurship and legal and human rights. Information on crop farming and job opportunities was also important to non-users.

Table 3: Information needs categories among users and non-users

Information needs categories	Users	Non-users
	(N=90) (Mean)	(N=90) (Mean)
Business and entrepreneurship	3.35	3.6
Crop production	3.1	3.33
Animal husbandry	2.96	2.81
Education	3.68	3.27
Job opportunities	3.61	3.28
Family/personal issues/problems	3.44	3.33
Health issues	3.78	3.6
Government-related information	3.49	3.27
Loan and micro-credit services	3.24	2.89
Legal and human rights	3.56	3.6
Entertainment and sport	3.36	3.08
Political issues	2.87	2.63
Road infrastructure	3.1	2.77

A Chi-square test was performed to analyse the existence of any relationships among the location and information needs of users and non-users. There was a significant relationship between location and some types of information needs of both users and non-users in the study sample, as shown in Table 4. For users, there was significant relationship between respondents' location and all types of information needs, with exceptions to information needs on government-related issues. The respondents' location had a larger relationship with the information on crop production ($V=0.608$) and animal husbandry ($V=0.465$). For non-users, there was a significant relationship between location and all information needs. Information on social issues, entertainment and sport ($v=0.481$) had larger relationships with the location, which

was followed by information on road infrastructure development and maintenance (V=0.456) and family or personal issues (V=0.454).

Table 4: Variation of information needs according to users and non-users and between three districts in Tanzania

Information needs categories	Users			Non-users		
	Pearson X ²	p-value	Phi and Cramer's V	Pearson X ²	p-value	Phi and Cramer's V
Business & entrepreneurship	34.827	0.00	0.442	34.979	0.000	0.441
Crop production	69.508	0.00	0.608	33.791	0.000	0.433
Animal husbandry	38.864	0.00	0.465	15.093	0.020	0.290
Education	22.735	0.001	0.355	31.188	0.000	0.416
Job opportunities	14.734	0.022	0.286	16.214	0.013	0.300
Family/personal issues/problems	21.200	0.002	0.343	37.152	0.000	0.454
Health issues	18.958	0.001	0.325	26.557	0.000	0.384
Government related information	11.865	0.065	0.257	18.674	0.005	0.322
Loan and micro-credit services	19.637	0.003	0.330	33.697	0.000	0.433
Legal & human rights	22.791	0.001	0.356	35.052	0.000	0.441
Social, entertainment and sport	26.708	0.000	0.385	41.661	0.000	0.481
Political issues	18.481	0.005	0.320	22.126	0.001	0.351
Road infrastructure development and maintenance	14.799	0.022	0.287	37.500	0.000	0.456

Information-seeking behaviour

Both Internet users and non-users reported major use of the mobile phone as their main source of information (see Table 5). Among the Internet users, relatives/friends, personal experience and radio programmes were the second other important sources, which were followed by Internet, television programmes, print books and newspapers. For the non-users group, relatives/friends, radio programmes and personal experience were the second-most important sources of information. Other important sources of information to non-users included: community leaders and government officers. Generally, mobile phones and interpersonal communication with relatives/friends, personal experience and radio programmes were largely cited as the main sources of information between the two groups. Posted letters were ranked low among the two groups.

Table 5: Information sources of rural women Internet users and non-users

Information sources	Users	Non-users
	(N=90)	(N=90)
	Mean	Mean
Personal experience	3.47	3.28
Family members or friends	3.5	3.52
Internet	3.39	1.3
Radio programmes	3.42	3.28
Print newspapers or magazines	3.13	2.77
Print books	3.16	2.66
Television programmes	3.28	2.81
Librarians	2.99	1.96
Mobile phones	3.56	3.57
Leaders in my ward/street/village	2.99	3.06
Government officers	2.88	3
Religious bodies (e.g., church, mosque)	2.71	2.53
Formal and informal groups	2.74	2.67
NGOs	2.53	2.33
Letters and post office	2.07	1.89

A? binary logistic regression was conducted to determine demographic factors that differentiate individuals, based upon the single dichotomous criterion variable of where they seek information (on the Internet or offline). Binary logistic regression generates odds ratios, which indicate the amount of change expected in the likelihood of using Internet to search information when there is one unit change in an independent variable, with all of the other variables held constant. A test of the full model was conducted to determine if the overall model was statistically significant.

The Omnibus test of model coefficients was found significant ($p, 0.001$). These results implied the statistical evidence of the model's fitness to the collected data. With respect to the model's predictive ability, the model was statistically significant (Chi-square 84.66, df 16, $p, 0.000$), and predicted 76.8% of the responses correctly (Nagelkerke R^2 0.572). The adjusted R-squares indicated that the overall model was satisfactory in explaining the variance in users and non-users of the Internet. The findings indicated that three (bolded) independent variables significantly related to the dependent variable (see Table 6), and thus they distinguished the Internet users group from the non-users. Education level (1.533) remained significantly related to Internet use, as did increased income level (1.759) and average number of information sources used (10.599).

Table 6: Results of binary logistic regression analysis regarding users and non-users of Internet

	Wald	P-value	Exp(B)
Age	1.515	0.218	1.664
Level of education	4.403	0.036	1.533
Main occupation (Reference: No job)	7.249	0.203	
Farmer	1.092	0.296	0.399
Small business	2.164	0.141	0.318
Government employee	0.178	0.673	1.822
Private sector employee	0.232	0.63	0.627
Student	1.726	0.189	6.345
Income level	5.155	0.023	1.759
Marital status (Reference: Not married)	3.121	0.681	
Living with domestic partner	2.035	0.154	0.085
Married	1.761	0.184	0.409
Separated	0	0.999	0
Widowed	0	0.999	0
Divorced	0	0.999	0
Location 1: (Reference: Kongwa district)	0.797	0.671	
Location 2: Sengerema district	0.131	0.718	0.702
Location 3:: Kilosa district	0.056	0.813	1.228
Information sources used	8.542	0.003	10.599

6. Business benefits

On the information needs, the study indicated that information needs of both users and non-users were location-specific. Similar findings were reported in previous studies [13, 17]. Although the major information need for both users and non-users was related to health issues, there were variations on other information-needs categories. Information needs of rural women varied between the two groups due to the economic activities that they were engaged in. The study findings showed that most users were either not employed, or they were engaged with small business activities, while non-users were either business women or farmers. Literature also shows that rural people have varied information needs due to demographic characteristics, and economic or social activities [13]. It is therefore important to determine information needs of rural women in order to design effective information services that focus on solving their problems.

The study also indicates that mobile phones and interpersonal communication with relatives/friends, personal experience and radio programmes were largely cited as the main sources of information between the two groups. The findings indicate that despite the advancements of Internet technology, rural women still prefer mobile phones and radio to access information, since both ordinary mobile phones and radio are affordable to most rural women. Further, there were slight variations on other sources of information. The Internet was an important source of information to Internet users as compared to non-users, because most users owned smartphones, laptops, computers and even tablets. Interpersonal communication with

friends/relatives and radio programmes were also cited as main sources of information to rural people in previous telecentre studies in Tanzania [14, 17].

The findings indicate that women with high level of education and income level were more likely to use the Internet than those with low level of education and income. Those who were able to access a large number of information sources were also more likely to use the Internet than people with low access to a large number of information sources. The study findings show that the main differences between user and non-user groups relate to traditional inequality levels in education, income and number of information sources used. Less-educated rural women with low levels of income are less likely to seek information online. Almost similar findings were reported in other studies: levels in education, age and income were the main factors that discriminated between online and offline seekers of health information in the United States [18]. It is therefore important to determine these factors so that providers of information services, such as public ICTs including telecentres, libraries and information centres, can provide their information services more effectively by identifying who is likely to seek information on the Internet or other offline sources.

7. Conclusion

The study findings showed that information needs of both users and non-users were location-specific. Although there were similarities on the major information needs and information-seeking patterns of both users and non-users of the Internet, some variations were noted. Major information needs of both users and non-users were related to health issues, but there were variations on other information-needs categories. Despite the advancements of Internet technology, rural women still prefer mobile phones and interpersonal communication with relatives/friends, personal experience and radio programmes to access information, since both ordinary mobile phones and radio are affordable to most rural women. The study findings provide insight into the variations between women who use the Internet and those who do not use the Internet to seek information through telecentres or mobile phones. Demographic characteristics related to education level, income and number of information sources used played a key role in discriminating between users and non-users of the Internet to seek information. The study therefore recommends the following:

- a) Telecentres should conduct regular studies to determine relevant information needs and information sources of the rural communities by developing community- and information-needs profiles. These studies should be conducted by using a participatory or grassroots approach, whereby communities will be involved in the design and conduct of the research. Telecentres can also keep track of user needs on a regular basis and determine which online information sources are utilised.
- b) Telecentres should promote and market their services to existing and potential users to enhance awareness and usage of their information resources and services among rural people. Such promotion strategies can include organisation of social events; periodic orientation programmes on the use of telecentres; participation in village meetings and major village events; and publication of the importance of their services through community radio and television, and through other print media, etc.
- c) Telecentres should diminish inequalities between users and non-users by combining their ICT training with other educational programmes to enable poorer and less educated women to access the Internet and gain benefit from it. These educational programmes

may include information literacy, adult literacy, English courses, leadership, entrepreneurship, business studies and other vocational training programmes, to motivate the rural poor to use the centres.

- d) Rural telecentres and libraries need to combine their core services with other information services which are relevant to the local communities. Thus, telecentres can establish capacity-building forums to enable rural people to learn from their peers, and participate in an interactive dialogue on issues important to them. Telecentres can also establish information services which are relevant to local communities, to support their socio-economic activities, such as information services on crop production, marketing, fishing, women's rights, etc. These will enable telecentres to meet local people's information needs and enable them to achieve their development objectives.
- e) Rural telecentres should play a proactive role in assisting rural people with inadequate information literacy skills to access correct online information, according to their needs.
- f) Telecentres should work with local communities and village leadership to create and share local or indigenous information in local languages. Telecentres can work with volunteers/rural people to collect and record local information and thereafter disseminate it on telecentre websites to enhance access to local knowledge. Telecentres can also create a subject-based catalogue of available online local/indigenous information sources and post them on their website to motivate rural people to access and use online information.
- g) Rural telecentres should provide access to online information in appropriate formats and channels that rural people use most. The findings showed that rural women mainly preferred use of face-to-face communication and oral channels (mobile phone and radio) to access information. Thus, telecentres should find creative ways to enhance access to online information by disseminating the same information via community radio and mobile phones. This initiative will also enable rural people to reduce the time and effort they spend on information-seeking behaviour, and further allow poor rural women who are less educated to also benefit from telecentres.
- h) The existing rural telecentres should collaborate with all stakeholders in their localities, including local government councils, local public libraries, not-for-profit organisations, development partners, private sector companies and local business people, to avoid duplication of similar activities, to bring sense of ownership, to enhance usage of their centres' information services and to ensure sustainability of the telecentres.
- i) Development partners, not-for-profit organisations, religious bodies and policy-makers should establish telecentres across all rural districts to enhance access to relevant information services to rural poor. All rural stakeholders such as chiefs, headmen, local councils, private sector companies and local business-people, amongst others, should be involved in the establishment of these centres to enhance ownership and sustainability of these centres.

The current study assessed only the online information-seeking behaviour of women, therefore future studies that exist for greater research cooperation between Europe and Africa in this area should include both men and women from different locations with access to the Internet to improve the generalisability of study findings. Further studies should investigate the other success factors, apart from demographic characteristics, on the information-seeking behaviour of both online and offline users in developing countries. Future studies should use mixed methods

and action-oriented studies to capture all dynamics of the Internet-based information-seeking activities through telecentres and mobile phones and their impact on the development of rural residents over time.

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