

Improvement of E-Government Service Usability in Developing Countries: Empirical Experiences of Uganda

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ABSTRACT

Despite several developments in e-Government, governments and citizens in most developing countries ineffectively and inadequately use e-Government services. This study sought to examine the areas in which usability of e-Government services in developing countries can be improved.

Both quantitative and qualitative research methods were used to collect and analyze data. A sample of 20 Government ministries under the National Backbone Project directory in Uganda was selected to participate in the study.

Findings indicate that functionality, flexibility, cost usability and accessibility are major requirements for improved e-Government service usability in developing countries. In addition, this paper posits that e-Government platforms should take consideration of accessibility, screen design, media use, and consistency, interactivity and content usefulness to the citizens in order to achieve successful usability of e-Government services.

Keywords: *E-Government, e-Government services, Service usability, Developing countries, Uganda*

1. INTRODUCTION

The developments in Information and Communication Technologies (ICTs) are increasingly influencing the way governments and businesses organizations operate. [1] argue that developments in e-Government have enabled Governments world-over to offer a set of services such as production, certification, control and authorization to their citizens with ease. Many innovative technologies such as e-Government have emerged. E-Government covers a full range of government activities such as internal processes, policy development and dissemination, and ensuring that government services are accessed by citizens electronically. The electronic interactions have rapidly shown immense potential for transforming the internal activities of all kinds of organizations. This has dramatically altered the relationships between governments and citizens as well as business organizations and their customers who use them.

Despite the above developments, governments and citizens in most developing countries ineffectively and inadequately use e-Government services. Literature suggests that among the constraints of e-Government services usability are limited access and sometimes no access to the Internet. In Uganda for example, only 6.4% of the population has access to the Internet [2]. Owing to this, citizens frequently visit government offices to seek services. Information based services such as admission lists, scholarship notices, tenders and circulars are pinned on notice boards in Ministries and sometimes published in local newspapers. These methods of information dissemination are usually expensive and have low coverage, especially for the rural community.

The government of Uganda has made efforts to formulate and implement the ICT policy. This policy is envisaged to increase penetration of ICTs through improved skills among the citizens. A number of

development partners such as the International Telecommunications Union (ITU), the World Bank, USAID and among others have also these initiatives. Consequently, several district web portals have been developed. In addition, rural Telecentres have been established across the country. However, to-date, the rate of e-Government service usability is still low [3]. In this paper, we examine the problems that governments and citizens face in accessing and using e-Government services in developing countries, while taking Uganda as a case study.

2. E-GOVERNMENT SERVICE USABILITY

According to [4], usability of services is the extent to which satisfaction of using a given service is attained. Usability of Information Technology (IT) services can be defined as "the extent to which the IT affords an effective and satisfying interaction to the intended users, performing the intended tasks within the intended environment at an acceptable cost" [5]. [4] argue that measuring usability has become a matter of concern where services are offered using technologically enhanced platforms such as the Internet. For effective usability e-Government services, they should be citizen-centric and results oriented. Further, usability of e-Government services has tended to succeed where such services run on interoperable platforms that enable creation of multiple access channels and re-usability. [6] and [7] identify the Internet as one effective way for achieving interoperability and hence improving e-Government service usability.

2.1 Criteria for E-Government Usability

Given that most e-Government services are offered via the Internet on government websites, web design factors may significantly influence usability. For effective usability of web-based e-Government services, literature posits that different criteria models including

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navigation, accessibility, and screen design, media use, consistency, interactivity and content usefulness are important. These are explained as follows:

a) Navigation

Navigation is the movement between from one page or website to another using hyper links. [8] states that good navigation in a website is comparable to a good road map. With good navigation, users know where they are, have been, and want to go from the current position. [9] argue that navigation is the key to making the browsing experience enjoyable and efficient. However the applicability of navigation depends on user environment, user experience, technology platform, and culture.

b) Accessibility

Web accessibility refers the ability to access a website from different browser platforms, either software or hardware related. This should be done in such a way that ensures that government websites are accessible to the target users. The higher the degree of accessibility, the higher the level of usability and the reverse is true. According to [10] websites should run on different personal computer platforms, networks, browsers and versions. However, to achieve a high degree of accessibility, loading time, browser compatibility, and search facility are important.

c) Screen Design

Screen appearance indicates the design of the website in terms of the on-screen information. During screen design, issues such as page layout and appearance should be taken into consideration. The choice of color can help improve usability of websites.

d) Media Use

Media use refers to the use of multimedia i.e., text, graphics, video, animations aimed at keeping users attention in order to enhance usability. However improper use of these elements may distract users and affect usability. The main multimedia elements include sound, graphics, images, audio and video.

e) Interactivity

Interactivity refers to the level of communication of the website in the form of contact information, enquiries, and forum. The features that facilitate a two way communication between users and site owners include emails, guest books, online forms, and net conference for enhancing web site worthiness and hence usability.

f) Consistency

Consistency refers to the uniformity of design, taking into considerations graphics, placement and observable schemes and patterns. Uniformity of the page layout; titles and subtitles, page footers, background, links and icons during the design are key factors for effective usability of websites.

g) Content Usefulness

Content refers to the information and general gist of the website. This largely depends on the goals of the online service. There are four basic guidelines for ensuring effective usability. These can be achieved by asking oneself the “who”, “what”, “when” and “where” questions as one is develops content for a website.

3. RESEARCH METHODS USED

3.1 Sample Design

The study used a sample of 20 Government ministries under the National Backbone Project directory. This provided a total of 20 Heads of IT departments from all Ministries and 20 other staff that were randomly selected from the IT department of each ministry. 5 Extra questionnaires were randomly included to cater for any circumstances that could affect the number of questionnaires brought back. This gave a total of 45 respondents that made up the study sample.

Random sampling was used to select 20 respondents who were not Heads of IT departments in the ministries. To identify the second respondent, each head of the IT department was asked to provide a list competent IT staff members other than themselves to participate in the study. Their staff names were given random numbers using the random number table as seen in Table 1. A second respondent was selected based on their random numbers. The random number table was formulated in Microsoft Excel using the Random function randbetween (a, b) where a and b is the range of random numbers i.e. from a to b e.g. for a=1000, b= 9999, the function randbetween (1000,9999) returns random numbers within 1000-9999 range.

Table 1: 500 Random Numbers

228	188	840	619	015	829	651	918	117	786	780	534	537
060	224	466	006	384	985	448	793	025	797	748	630	983
925	363	049	256	370	295	519	846	865	278	306	487	942
577	143	444	071	192	562	718	515	124	032	043	011	107
818	683	822	406	921	641	950	021	075	914	395	953	545
239	156	936	331	145	968	235	434	103	096	850	587	111
541	782	057	701	036	765	844	342	113	064	946	299	241
679	100	573	686	611	836	897	181	594	622	804	993	893
459	761	121	509	878	769	566	175	348	359	327	423	135
000	139	722	972	957	267	338	391	231	711	004	861	555
207	252	647	196	284	551	750	153	412	167	904	427	857
833	374	017	352	081	160	658	164	380	263	615	558	996
416	889	737	662	886	213	498	910	673	854	310	209	776
812	438	825	929	085	882	491	665	675	643	739	185	316
455	039	288	274	583	654	707	547	028	320	177	872	523
569	964	513	601	868	801	470	729	218	220	744	908	149
690	068	669	132	476	974	481	697	579	932	609	047	733
940	053	978	203	530	814	961	989	171	626	526	092	128
754	876	246	402	199	808	716	726	694	790	502	633	772
089	605	590	900	705	758	598	079	637	571	941	831	628
237	411	421	389	485	197	062	201	784	034	019	329	400
453	293	774	066	923	618	269	314	710	258	347	614	216
475	229	966	489	919	895	436	415	144	222	720	226	443

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325 678 620 058 479 951 799 724 949 276 560 973 735
 917 372 272 838 874 500 887 991 148 945 554 727 738
 706 802 248 379 517 101 351 336 646 770 610 090 383
 240 934 586 631 026 575 663 930 863 532 791 280 282
 806 970 212 752 130 731 194 539 037 543 759 642 994
 671 109 795 002 116 041 265 592 877 023 051 233 688
 588 154 190 817 938 308 464 261 870 778 789 756 853
 564 695 834 152 667 652 962 767 821 660 141 699 291
 250 902 682 077 891 714 981 180 849 842 596 599 122
 286 528 069 447 511 855 088 859 810 692 045 987 425
 112 319 432 357 582 909 927 340 368 549 005 639 205
 507 133 254 624 186 094 105 073 169 881 746 885 468
 703 013 084 137 977 457 607 301 998 393 208 030 297
 496 165 158 913 650 173 603 845 120 763 098 827 906
 404 176 126 009 361 304 742 162 635 674 898 959 244
 656 684 866 056 955 521

analysis. Items on functionality, cost friendliness, flexibility, usability and accessibility had a high factor loading greater than 0.5.

Further to the above, reliability of the research instrument was achieved through following Kirakowsk's reliability guidelines [11]. In particular, the questions were presented in simple and precise terminology, without assuming any responses. In addition, double-barreled questions were eliminated during questionnaire pretesting.

Lastly, data was analyzed with descriptive statistics for frequencies by following the steps in SPSS software. The items that were above 50% were considered to be significant responses while those scoring below were dropped.

* This table of 500 random numbers was produced according to the following specifications: Numbers were randomly selected from within the range of 0 to 999. Duplicate numbers were not allowed.

The total number of returned responses to the survey was 42, of which 39 were usable and representative of the intended population. Some institutions could not respond due to the limitations enshrined in their ICT policies. The sample size was enough and the intended audience was reached.

3.2 Validity, Reliability and Data Analysis Methods

A pilot survey was conducted on all staff in the department of Management Information System in Makerere University Business School to validate the research instrument. A 5 point likert scale was used to analyze experts' views on the validity of each question. These included Strongly Disagree, Disagree, Not Sure, Agree, and Strongly Agree. The likert scale was recommended by experts since this provides standardized response categories in survey questionnaires. Finally, the respondents were asked to indicate whether there were any other issues that they thought should be included in the survey instrument. Respondents' views were analyzed. At first, the questionnaire was too big and included some irrelevant questions. In addition some questions were not well phrased. Following the reviews, a number of questions were rephrased while others were dropped. The final questionnaire was also reviewed and approved by the research department of Makerere University and the study supervisor, Professor Irina Zlotnikova. These procedures ensured the questionnaire used in this study was valid.

Critical dimensions that measure the requirements functionality, cost friendliness, flexibility, usability and accessibility were tested. This was done by running and comparing the Cronbach Alpha Coefficients (CAC) obtained against 0.6 set. The item/factors with CAC less than 0.6 were deleted. This continued until all items had an acceptable CAC. The items that passed the Cronbach's Alpha test were further subjected to factor

4. FINDINGS

4.1 Respondents' Characteristics

Usable data were collected from a total of 39 respondents from the different institutions. 74% were male and 26% were female as shown below in Table 2. This is an indication that there are more males in the IT field than females.

Table 2: Gender

Gender	Frequency	Percentage
Male	29	74
Female	10	26
Total	39	100

Results in Table 3 show that 39% respondents were between 20 and 29 years, 54% were between 30 and 39 years, 5% were between 40 and 49 years and 3% were above 49 years.

Results in Table 3 show that only 18% of the respondents had experience less than 1 year. 28% had 2 to 3 years experience, 33% had 4 to 5 years, 13% had 6 to 7 years, and 8% had above 8 years of experience in this study. Therefore, according to the findings, most respondents were well experienced in IT field and were youths, i.e. below 40 years.

Table 3: Age and experience

Age	Frequency	Percent
20-29	15	39
30-39	21	54
40-49	2	5
50 and Above	1	3
Total	39	100
Experience	Frequency	Percent
Less than one year	7	18
2-3 years	11	28
4-5 years	13	33
6-7 years	5	13
8 and above	3	8
Total	39	100

4.2 E-Government Service Usability

The study investigated the issues related to the requirements for improved e-Government service usability. The requirements were identified and classified under four main classes such as functionality, cost friendliness, flexibility, Usability and accessibility.

4.2.1 Functionality Dimensions

Table 4 shows how the respondents rate the different dimensions of functionality in relation to usability of e-Government services.

Table 4: Functionality dimensions

	Percentage Ranking				
	Strongly Disagree	Disagree	Not Sure	Agree	Strong Agree
Service Delivery Mission Vision	-	5.1	5.1	23.1	66.7
Adherence to accepted web development standards	2.6	2.6	17.9	25.6	51.3
Flexible and Compatible users numbers		5.1	15.4	15.4	64.1

Most respondents strongly that service delivery mission and vision (67%), adherence to accepted web development standards (51%), flexible and compatible users numbers (64%) are important functionality requirements for effective usability of e-Government services.

4.2.2 Cost Dimensions

Table 5 shows how respondents rated the different dimensions of cost requirement in relation to usability of e-Government services.

Table 5: Cost dimensions

	Percentage Ranking				
	Strongly Disagree	Disagree	Not Sure	Agree	Strong Agree
Investments costs	-	15.4	10.3	25.6	48.7
Administration and maintenance costs	-	5.1	20.5	15.4	59.0
Online services access costs	-	10.3	5.1	10.3	74.4

Results in table 5 indicate that most respondents strongly agreed that online services access costs (74%) were the most significant considerations under the cost requirements for effective usability of e-government services. The respondents also strongly agreed that administration and maintenance costs (59%) influenced e-Government service usability.

On the other hand, only 48.7% strongly agreed that investment costs influenced usability of e-Government services.

4.2.3 Flexibility Dimensions

Table 6 shows how the respondents rated the different dimensions of flexibility requirement in relation to usability of e-Government services.

Table 6: Flexibility dimensions

	Percentage Ranking				
	Strongly Disagree	Disagree	Not Sure	Agree	Strong Agree
Capturing new data information about new developments	-	5.1	12.8	28.2	53.8
Building of multilingual systems	-	-	17.9	20.5	61.5
Providing timely feedback	-	5.1	28.2	10.3	56.4

Results in table 6 indicate that most respondents strongly agreed that building of multilingual systems (62%), ensuring timely feedback (56%) and capturing new data/ information about new developments (54%) are

flexibility dimensions that influenced e-Government service utilization.

4.2.4 Usability Dimensions

Table 7 shows how the respondents rated the different dimensions of usability in relation to usability of e-Government services.

Table 7: Usability dimensions

	Percentage Ranking				
	Strongly Disagree	Disagree	Not Sure	Agree	Strong Agree
Reliability and Error Tolerance	2.6	7.7	17.9	23.1	48.7
Efficient and Productive systems	-	7.7	10.3	23.1	59.0
Consistency of user interfaces	2.6	7.7	17.9	10.3	61.5

Results in table 7 indicate that most respondents strongly agreed that Consistency of user interfaces (62%) enhanced e-Government service usability. Respondents also strongly agreed that efficient and productive systems (59) improved usability.

However only 49% of the respondents strongly agreed that reliable and error tolerant systems improved usability of e-Government services.

4.2.5 Accessibility Dimensions

Table 8 shows how the respondents rated the different dimensions of accessibility dimensions in relation to usability of e-Government services.

Table 8: Accessibility dimensions

	Percentage Ranking				
	Strongly Disagree	Disagree	Not Sure	Agree	Strong Agree
Navigation time	-	10.3	7.7	25.6	56.4
Access for all without discrimination	2.6	10.3	12.8	12.8	61.5

Results in table 8 indicate that most respondents strongly agreed that access for all without discrimination (62%) and navigation time (56%) influenced usability of e-Government services.

5. DISCUSSION OF FINDINGS

In the delivery of e-Government services, trends are towards increasing functionality [12]. In this study, the findings confirmed functionality dimensions as service delivery mission and vision, adherence to accepted web development standards, flexible and compatible user numbers for effective usability of e-Government services. [13] argues that the success of e-Government is having a

clear vision. However findings indicate that like service delivery mission/vision, accepted web development standards, flexibility and compatible user numbers are highly significant requirements in the success of e-Government service usability.

[5] define costs in terms of tasks being performed within an environment at unacceptable cost. According to [14] high unaffordable costs can frustrate projects. In this study, the cost requirement included; initial investment, administration and maintenance, training, access, clarity, and awareness. The findings indicated that cost dimensions such as online services access costs and administration and maintenance costs are highly significant cost requirements for the usability of e-Government services. These costs should be very low so that e-Government services are easily and cheaply accessed. As [15] posits, delivery of services using ICTs is more cost effective and efficient.

For a usable and easily navigable system, a user has the capability to perform different actions, as compared to a limited navigable system where the IT designer may choose a proper way according to the user and/or the task [16]. Flexibility is highlighted in the studies of [17] and [18]. In this study, flexibility included requirements such as capturing new data about developments, review and control, multilingual, and timely feedback. Findings indicated that only capturing new data about developments, multilingual systems and timely feedback as flexibility requirements are highly significant for the usability of e-Government services.

[4] put forward that usability is most important as more and more information, products, and services become available through electronic means. Many models of usability evaluations proposed by [19]; [20]; [21]; [22]; [18] involve the employment of usability dimensions to focus on user perceptions, their interactions with the system, and user's interaction with a resource by monitoring the number of errors. In this study, usability involved ease to learn, error tolerance, satisfaction, efficiency, and consistency of user interfaces (memorability). Findings indicated that only efficiency and consistency of user interfaces are highly significant usability dimensions for e-Government services.

[23] argues that where there exist barriers to online service delivery such as unstable power supply, other alternatives should be exploited. According to [24], the alternative methods sometimes offer more benefits to certain users who have no access to the Internet and those with impairments. In this study, the accessibility requirements included alternative service delivery channels, navigation, and indiscriminate access. Findings indicated that only navigation time and access for all are significant accessibility requirements for the usability of e-Government services.

5. CONCLUSIONS

This study has been vital in putting forward the salient factors influencing e-Government service usability in public service delivery. Findings indicated that functionality, flexibility, cost usability and accessibility are major requirements in the usability of e-Government services. The criteria identified in this research that are used for e-Government usability include; accessibility, screen design, media use, consistency, interactivity and content usefulness. A simple, easy to use and systematic government website will significantly improve e-Government service usability. The support has been based on e-Government and usability theory and ideas of [26]; [18]; [25] for building usable web applications.

The research was limited to e-Government service usability and could not look at other factors that affect e-Government such as implementation in developing countries, their strength and weaknesses. The study also could not cover a larger sample because of time and other constraints. Even the questions were only limited to usability requirements, many variables were not looked into for example problems associated with e-Government usability.

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