Information Sciences Letters

Volume 8
Issue 2 *May 2019*

Article 2

2019

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Irum Naz Sodhar
Shaheed Benazir Bhutto university, Shaheed Benazirabad, Sindh, Pakistan, irumnaz@sbbusba.edu.pk

Azeem Ayaz Mirani
Shaheed Benazir Bhutto university, Shaheed Benazirabad, Sindh, Pakistan, irumnaz@sbbusba.edu.pk

Anam Naz Sodhar
Quaid-e-Awam University of Engineering, Science and Technology, Nawabshah, Sindh, Pakistan.,
irumnaz@sbbusba.edu.pk

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Recommended Citation

Naz Sodhar, Irum; Ayaz Mirani, Azeem; and Naz Sodhar, Anam (2019) "Automated Usability Evaluation of Government and Private Sector Educational Websites of Pakistan," *Information Sciences Letters*: Vol. 8 : Iss. 2 , Article 2.
Available at: https://digitalcommons.aaru.edu.jo/isl/vol8/iss2/2

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Information Sciences Letters
An International Journal

http://dx.doi.org/10.18576/isl/080202

Automated Usability Evaluation of Government and Private Sector Educational Websites of Pakistan

Irum Naz Sodhar[1,*], *Azeem Ayaz Mirani*[1] *and Anam Naz Sodhar*[2]

[1] Shaheed Benazir Bhutto university, Shaheed Benazirabad, Sindh, Pakistan

[2] Quaid-e-Awam University of Engineering, Science and Technology, Nawabshah, Sindh, Pakistan.

Received: 10 Oct. 2018, Revised: 28 Oct. 2018, Accepted: 15 Nov. 2018
Published online: 1 May 2019

Abstract: Web usability is an important field of Human computer interaction (HCI). Now-a-days customer satisfaction and performance related to websites usability are important factor in web development. Web usability is important for customers, who mostly depend on websites and get information easily, Such as online advertisement, Admission on different categories, tender, educational activities and courses etc. According, educational websites further need to describe the different types of usability issues in websites. Website usability needs greater interest of research and improvement in content field. Some general and technical issues identified by educational websites of Pakistan by using SEO (Search Engine Optimization) tool. For usability testing total number of 15 universities are selected for the study. These websites include 10 public sector universities and 5 private sector universities. A comprehensive analysis of the data presents the usability of educational websites. Three usability attribute are considered for usability testing i.e high, medium and low. These attribute are tested by applying on different universities websites.

Keywords: Usability, Human computer Interaction (HCI), Educational Websites, Nielsen Heuristic, Summary.

1 Introduction

Internet and web technology is important source of communication. Technology based information sharing is easiest and cheapest way in these days. This information sharing may occur by different website contents over web. Web which is composition of several web pages which makes a single website. These websites have different tools and techniques to make them more efficient, secure and reliable development of websites which can facility ease of usage for the users. Content sharing, information access and make aware from different aspect of life is main theme of websites over internet.

Computer web technology comprises on several factors which involve web security, usability, efficiency, reliability, web semantics and web analysis. For website performance analysis different online tools are used to measure website efficient parameters (Kaur, S., Kaur 2016).Website risk analysis and measuring the security prevention tools are important to measure website security and can assess from unwanted attacked that are major cause of information theft. It is necessary to keep these factor to develop website which can impact positively. Internet comes with several emerging technologies which have been greater impact on communication technology. Web technology is one of leading context of the world research community which involves markup language and multimedia contents. In computing it works on hypertext markup language and cascading style sheets which supports the navigational features by different web page links. A web page is sub part or sub unit of web site which is actually collection of web pages. Website development involves many factors for the better and reliable communication such as reliability, security, integrity and usability. This study is focuses on usability factor which is considered main component of website. Many author have focused on usability of website by using different usability testers. A detail literature review is given below:

Users of different community, profession and age interact with number of websites in daily routine. However in educational institutes new and young professionals are used to involved and interact with websites for context awareness related to educational activities of particular

*Corresponding author e-mail: irumnaz@sbbusba.edu.pk

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institutes. Website usability is one crucial factor of internet and web development that is studied in (Ismailova & Kimsanova, 2017) investigated the usability and accessibility of the website. The accessibility and usability ensures the quality websites. A detailed analysis is applied in their study to check these two factors. In this analysis the online website usability analysis tools are used to evaluate the website usability factors. Final hypothesis is calculated by using statistical tools called SPSS (Statistical package for social science). The parameters of interest which are evaluated over online tools include upload time, broken links, and error rate and browser compatibility issues. Architectural design is important area of web site usability which can improve better performance if it is well developed and well organized web pages designed. The two main factors usability and information architecture are focused in (Perdomo, Cardozo, Perdomo, & Serrezuela, 2017). Author focused on review of two important architecture designed user – centered and user-driven development with respective to usability factor.

The approach for evaluation is followed by heuristic approach which is important inspection method. The important usability goals user characteristics, environment, task and work flow are considered their study for the better evaluation. The use of mobile technology is grown due its ease of usage on the same page it brought several issues which can damage and effect on user data over. The social media websites are mostly used for today in all over the world. Usability factor is also encounter for the mobile and web developers to adopt latest feature of web technology. Website literature since 1994 to 2018 has been conducted in (Ramos, Rita, & Moro, 2019) which is used to evaluate the text mining and manuscript which are adopted to discover pertinent term.

The important gap and research contribution in future impacts are highlighted in their study. Web System visibility is important factor in terms of usability which covers many crucial factors in web technology. The important factors user control, freedom of use, user help recognize, the recovery from error and diagnose those errors are important factors to improve and focus the usability more clearly. These factors are focused in (Awlad & Yavuz, 2019) in which author selected ten Libyan government websites for usability analysis by following web content accessibility guide line version 2.0. The extensive results showed that most of the website does not focus the proper usability parameters for the improvement. E-Commerce, E-learning and E-Shopping is due to web technology and users of different community performs billions of activities all over the globe. The study in (Gumussoy, C. A. (2016) focused on web engineering techniques for efficient and reliable implementation of websites. Important factors of web engineering like heuristic approach is followed to identified the usability factors. Usability catastrophe is focused in study for evaluation of website.

2 General Method

The main elements of the study were used such as: Data, Educational websites, evaluation on automated tool Web page Analyzer and finally evaluated results based on tool. The goal of the study to determine usability of set educational websites of Pakistan included Government and Privates sites of education. This experimental study based on four steps which are: Data, Educational sites, Evaluation and Results.

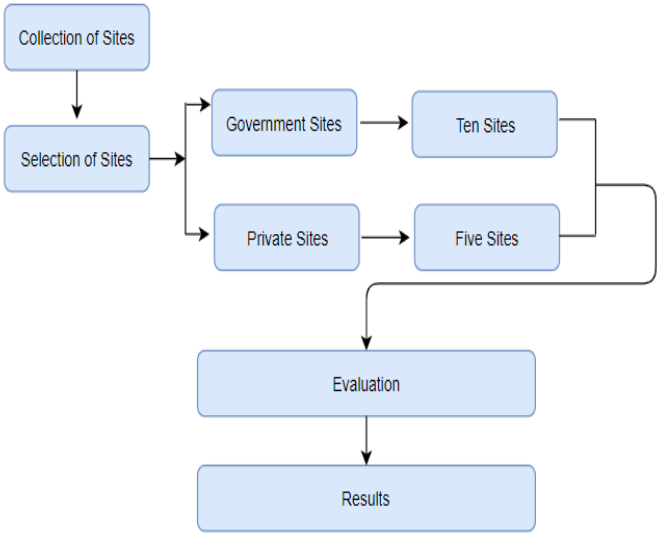

Fig. 1: Research Methodology.

Figure 1 shows four steps of methodology such as Data, Educational sites (Government and Private), Evaluation and results.

First step: Data is available on web different kinds. The web contains lot of sites that contents relate to organization, business, educational etc. The data on the sites includes images, text, graphics, video, numerical etc. Select appropriate data for the evaluation of usability of sites.

Second Step: Educational sites are also divided into two categories suchas: Government and Private sites. Those could include sites that have topic related sources that help users for the learning.

Three Step: Performed evaluation of Government and Private sites on automated tool and shows which site is best according testing on automated tool.

Four Step: Results get from automated tool and compare of all sites results. These based on this tool.

3 Usability Testing Tool

SEO web page analyzer tool used for this study to measure the usability of sites, this tool analyze the web pages and findout issues where occur. This webpage analyzer tool split the architecture of sites and content of sites and

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assesses the build quality and contents quality from usability and search engine point of analysis. Where the green tick mark used as (Pass) and red cross mark (fail) sign will be demonstrated for each section of the report.

structure of Search Engine Web Page Analyzer tool used for measure the usability of educational sites (Table 1) with get reports of each site from tool.

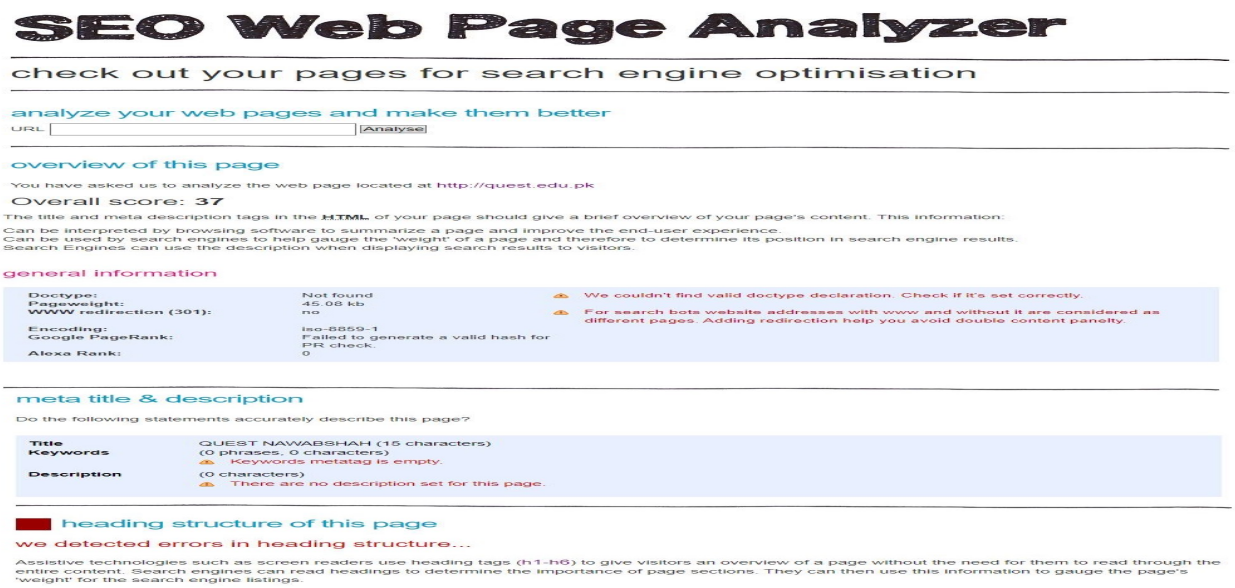

Fig.2 : Web Page Analyzer Tool.

Table 2 shows the result of government sites on Webpage Analyser tool, those result depends on six attributes such as Sites, Page Weight, Internal Links, External Links, Total Images and Overall score site. Ten government sites used for this research and measure the values of each attribute.
Table 3 shows the result of private sites on Webpage Analyser tool, those result depends on (six-6) attributes such as Sites, Page Weight, Internal Links, External Links, Total Images and Overall score site. Five private sites used for this research and measure the results of those sites. Overall score of each site shows S11-58, S12-56, S13-48, S14-43 and S15-44. Overall score of all sites are different.

site, Internal links of site, External links of site, total images on the site and Overall score of sites. Government sites are S1 to S10 and Private sites are S11 to S15. First testing of government sites which are:
Different values of each site. Overall score of each site shows S1-37, S2-36, S3-45, S4-66, S5-45, S6-63, S7-47, S8-47, S9-40, and S10-49. S7 and S8 are overall score of site attribute same but different values of other attributes.
Page weight of sites values are different in eight sites but two sites are same values those sites are S1 and S4. S5 is less weighted page as compare to other sites. Second attribute Internal links of sites values are different from each other no one site value is same in internal link.

Third sign used question mark shows areas that cannot be keep counted and necessitate further interaction of humans. Alot of attributes are available which are: major, minor further divided by sub section shows in figure 2 to overall

Table 1: Official Sites of Educational Websites Evaluation on Automated Tool.

S.NO:	Official Links	Webpage Analyser Tool
1.	http://quest.edu.pk	Yes
2	https://www.pumhs.edu.pk	Yes
3.	http://www.sbbuvas.edu.pk	Yes
4.	http://www.usms.edu.pk	Yes
5.	http://usindh.edu.pk	Yes
6.	https://www.muet.edu.pk	Yes
7.	https://www.gcu.edu.pk	Yes
8.	http://www.qau.edu.pk	Yes
9.	http://www.pieas.edu.pk	Yes
10.	http://www.gu.edu.pk/New/index.aspx	Yes
11.	http://www.myu.edu.pk	Yes
12.	https://www.usa.edu.pk	Yes
13.	https://www.ucp.edu.pk	Yes
14.	https://www.hajvery.edu.pk	Yes
15.	https://www.hup.edu.pk/admissions/	Yes

Table 2: Results of Government Educational Websites Evaluation on Webpage Analyser Tool.

Sites	Page	Internal	External	Total	Overall

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(S)	Weight	Links	Links	Images	score site
S1	47.93 KB	96	14	27	37
S2	91.04 KB	76	19	127	36
S3	27.93 KB	62	2	20	45
S4	47.12 KB	35	4	22	66
S5	11.99 KB	124	43	29	45
S6	80.15 KB	128	25	47	63
S7	78.62 KB	64	13	70	47
S8	107.74KB	194	122	27	47
S9	267.2 KB	74	14	61	40
S10	71.52 KB	73	14	23	49

Table 3: Results of Private Educational Websites Evaluation on Web Analyser Tool.

Sites (S)	Page Weight	Internal Links	External Links	Total Images	Overall score sites
S11	47.09 KB	72	6	11	58
S12	200. KB	186	16	35	56
S13	90.23 KB	59	16	80	48
S14	86.93 KB	12	73	14	43
S15	944.61 KB	156	35	165	44

Third attribute External links of sites values are different in eight sites but two sites are same values which are: S9 and S10. Total image is the fourth attribute of site, the values are different in eight sites but S1 and S8 has been same value. Fifth attribute of site overall score of each site is dissimilar value but two sites are same site score (S7 - S8) and (S3 –S5). Overall score of each site is dissimilar but two sites are same site score (S3 –S5) and (S7 - S8).

Second testing of Private sites which are: First attribute of testing Page weight of sites, Page weight values are different in all sites. Second attribute Internal links of sites values are different from each other no one site value is same in internal link. External links of sites values are different in three sites but two are same values in S12 and S13. Fourth attribute of site is total images of sites has been different in all sites. Fifth attribute of overall score of each site is different. Fifth attribute of site overall score of each site is dissimilar value. These results are obtained from Webpage Analyser tool. Overall score of sites and provide results of site.

Table 4: Government and Private educational websites usability Score.

Score	Government Sites	Private Sites
High	S4 and S6	S11 and S12
Medium	S3, S5, S7, S8 and S10	S13, S14 and S15
Low	S1, S2 and S9	------

Table 4 shows the score of all sites to measure the usability score of sites as: High, Medium and Low. Government sites measure the usability score as: The high score of sites are S4-66, S6-63. The medium score of S10-49, S7-47, S8-47, S3-45, S5-45, Low score of S9-40, S1-37, S2-36, Private sites measure the usability score as: The high score of sites are S11- 58 and S12-56. The medium score of S13-48, S14-43, S15- 44, No any low score found in private sites at the time of testing on web analyser tool.

5 Conclusions and Future Work

The main purpose of this study to examine the usability of educational websites of Pakistan, This study only performed in educational domain and used two types of educational websites government and private for the usability testing. The usability testing performed on web page analyser tool. This tool is a freely available on internet and run almost all browsers. This study based on five attribute of results such as Page Weight, Internal Links, External Links, Total Images, Overall score of sites. This study further needs to pay attention in field of usability, accessibility, interoperability etc. Lots of free tools available on internet for the research of usability.

Tips for Web Developer:

We build the following suggestion for developer, who are balancing Educational Websites and usability in their creation of multi-page websites, and for future studies:

- Develop websites according to need of students who frequently used educational sites. Should present all thing in websites related to education
- Websites open in all devices either computer laptop cell phone tablet etc. Developer must focus on operability of systems.
- Interface must attractive most of websites having huge amount figures on main page these images continuous move on main page. All privileges give to user easily access educational websites.

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Irum Naz Sodhar, working as Lecturer in Information Department, Shaheed Benazir Bhutto University, Shaheed Benazirabad, Sindh Pakistan.
I am doing Ph.D degree in Information technology from Quaid-e-Awam University of Engineering, Science & Technology, Nawabshah Sindh Pakistan.

and having al basic degrees of B.S (Computer Science) and M.S (Software Technology) from Quaid-e-Awam University of Engineering, Science & Technology, Nawabshah Sindh Pakistan.

Azeem Ayaz Mirani, working as Lecturer in Information Department, Shaheed Benazir Bhutto University, Shaheed Benazirabad, Sindh Pakistan. I am doing Ph.D degree in Information technology from Quaid-e-Awam University of Engineering, Science & Technology, Nawabshah Sindh Pakistan.
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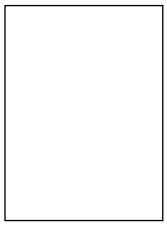

Anam Naz Sodhar, doing Postgraduation degree in Computer Communication & Networks from Quaid-e-Awam University Nawabshah Sindh Pakistan. I did B.E in Telecommunication Engineering from Quaid-e-Awam University of Engineering, Science & Technology, Nawabshah Sindh Pakistan

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