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Usability Evaluation of E-Government Website: A Use of System Usability Scale

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***Abstract*- The site's usability and availability standards of e-government sites should be better that are further operating and make further advantageous to the web clients. Effectiveness is a critical factor in clients' commitment to e-government. In any case, flow research has not given a lot of consideration to assessing the convenience of e-government web pages or websites. All things considered, this study offers an observational examination that applies a client's attentive way to deal with assessing proficiency in the current e-government site, i.e., punjab public service commission (PPSC) in Pakistan. In light of the issues found regarding the user interface, an alternate arrangement, complete plan with recommendations is proposed with initial inspection. This review concern evaluated the usability of the most popular e-government websites and this study's purpose is to determine to explore the factors that disturb the user experience of e-government websites, will discuss the previous studies, and will perform SUS for inspection the usability of current E-Government websites.**

***Index Terms*-- E-Government Websites, Usability Testing, Customer Satisfaction, SUS**

I. INTRODUCTION

E-Government plans to convey advantages to government and residents by further developing straightforwardness, proficiency, trust, and resident interest. In any case, e-government drives face a few obstructions. One of them is helpless ease of use. The public Web or websites is an overall relationship of computers, where countless computers are interconnected all across the world. The World Wide Web is quite possibly the most famous and basic Web application and individuals consistently survive strongly dependent on it. As you know huge pieces of computers are work territory PCs, UNIX workstations that stock and forward data, for instance, Web pages and Email posting. This paper presents an outline of various strategies and segments of the interface of website accessibility and usability [1-5].

Nowadays, there are essential quantities of E-governments working at universal and close by planes that are open by methods for the Internet which give an assortment of online data and administrations. The site works like a channel or window among government and residents. Through different aspects the requirements can be taken care of, they can be on different ends but what we will be looking at is the usability of the e-government websites, which can be termed as "Software Usability". Usability can be defined as how well a user can use a particular app to achieve his/her particular goals. To measure/test usability different factors play a part, that help determining the usability of software that we need to test for. In this paper, we will review the current existing evaluation and the literature available to review, and we'll test one of our scenarios through the "System Usability Scale". SUS (System Usability Score) is one of the methods that allow us to calculate usability. It helps measure the usability purely from the user's perspective. We will consider two of the e-government websites and calculate their SUS. The worldwide standards described convenience as to how much resolved customers to achieve showed focuses with attainability, proficiency, and fulfillment in a foreordained arrangement of use can use a thing [6-10].

A. SIGNIFICANCE OF RESEARCH:

Satisfaction is acknowledged as a key important aspect of any website. The quality assurance of a website depends on mechanization testing devices that decreased the expense and increase efficiency. The productivity testing instruments are utilized to decide the proficiency of sites and their adequacy [11-13]. The exhibition of a site can be a fundamental component in its success.

B. AIMS AND OBJECTIVES

The aims and objectives of this study are:

- The use of the e-government website (satisfaction in a particular context of use).
- Provide a better user interface of e-government sites for clients.
- Provide a better user interface and interaction.
- Explore and evaluate factors of the interface.

II. RELATED WORK AND BACKGROUND

A. E-GOVERNMENT WEBSITES

E-Government means to convey advantages to government and residents by further developing straightforwardness, productivity, trust, and resident interest. E-government sites

permit the client to work following tasks (Fig. 1) Government-to-Employee (G2E), Government-to-Business (G2B), Government-to-Citizen (G2C), and Government-to-Government (G2G) [1].

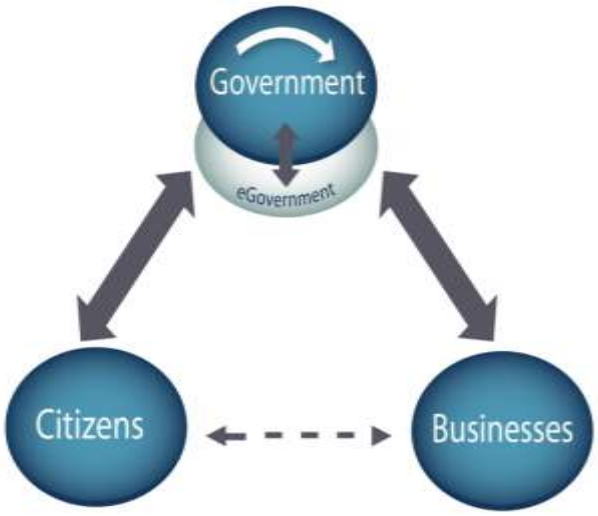

FIGURE 1: G2C, G2B, G2E, G2G

It involves different features that are accessible to the user. Following are some of the features that a user can use [1],

- Apply for jobs vacancies
- Check Result statistics
- Check Advertisements etc.

B. PREVIOUS WORK

In this study, we have combined a literature review with a minor field study in terms of usability of the system, Usability and HCI principles are termed in the sets: usability characterizations, use in perspective, the interface of the software, and interaction, the development process, and competency of the organization. The applicability of the standards is discussed [2] for Usability and HCI as follows:

- The use of the product (effectiveness, efficiency, and satisfaction in a particular Context of use).
- The user interface and interaction.
- The process used to develop the product.
- The capability of an organization to apply user-centered design

Usability is the ability of a system to provide conditions to users to perform tasks effectively, efficiently, safely while enjoying the experience. Where [6] given that usability in some random occurrence is characterized by the setting of the utilization of a framework, it follows that as a general rule, how you measure usability will likewise essentially be characterized by that unique situation. ISO 9241-11 separates the estimation of usability into three independent.

Elements that should be characterized comparative with the setting of utilization, such as Effectiveness, Efficiency, and Satisfaction (Table I)

TABLE I: ISO 9241-11 USABILITY EVALUATION MODELS TECHNIQUES

Efficiency	Speed of performance
	Time to learn
Effectiveness	Retention over time
	Rate of errors by users
Satisfaction	Subjective satisfaction

Usability is the adequacy of a framework for a specific class of clients completing explicit undertakings in a particular climate. The user's performance, ease of use affects their satisfaction, while acceptability affects whether the product is used. Subsequently, it is vital that each product expert not exclusively knows about different usability techniques [5] where assessment strategies and test techniques. It also quickly determines which method is best suited to every situation in a software project. One of the basic lessons we have learned in usability engineering is that usability must be considered before prototyping takes place [11].

Within the field of ergonomics, in e-government websites, the ideas of usability, user experience, and availability have assumed an undeniably significant part as referenced in the below illustrations (Fig. 2). It is analyzed the importance of these ideas and their relationship to one another, which incorporated an investigation of the definitions, methods, and typical outcome measures employed [2].

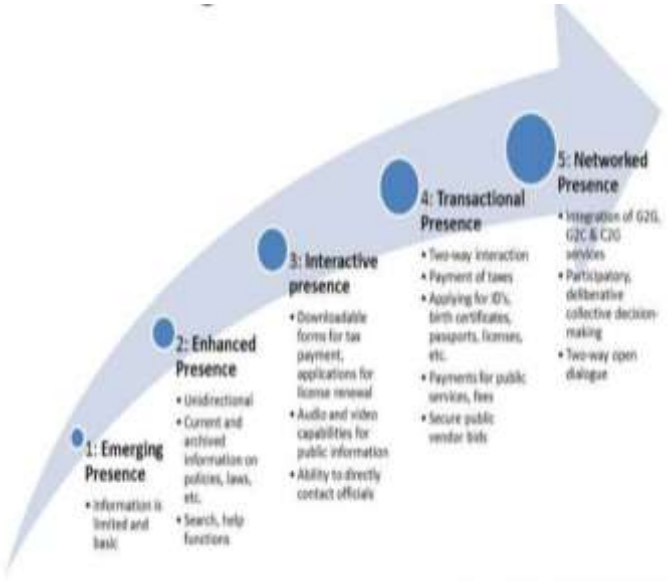

FIGURE 2: CONCEPTS OF USABILITY, USER EXPERIENCE, AND ACCESSIBILITY

a. USABILITY

Usability defines different perspectives on the subject of its features (Table 2). A few specialists researchers have unsound perspectives about the principle ascribed of usability, which is following:

The subject of its attributes (Table 2). Several researchers have unstable views about the main attributes of usability, which are following:

- Efficiency

- Effectiveness
- learnability
- error tolerance
- satisfaction
- memorability

b. USABILITY OF E-GOVERNMENT WEBSITES

All features of an e-government website have to make considering the usability point of view of the user. There are studies available that tell that why users avoid using the e-government websites, which involves the following elements to be main things [5], like,

- The visibility isn't appropriate,
- Use of inappropriate colors,
- Not clear information on the icons,
- Difficulties in tracing through the application,
- Menus were not desirable,
- Difficulties in usage etc.[3].

c. USABILITY EVALUATION METHODS:

Standard models used in various studies can be analysed discussed in Table II to measure the usability of existing software.

TABLE II: CLASSIFICATION OF USABILITY EVALUATION MODELS

Model	Attributes
Shackel Model (1991)	Effectiveness
	Flexibility
	Learnability
	Attitude
Nielsen Model (1993)	Learnability
	Efficiency
	Memorability
	Errors
	Satisfaction
ISO 9241-11 (1998)	Effectiveness
	Efficiency
	Satisfaction
ISO 9126 (2001)	Understandability
	Learnability
	Operability
	Attractiveness
	Usability compliance

III. RESEARCH METHODOLOGY

A. SELECTION OF PLATFORM

Now a day, Usability is a major challenge for users if UI is better for any software or website then UX (user pleasure) will also be better. It is observed that more than 10 e-government websites and felt usability is not good and picked the website of PPSC www.ppsc.gop.pk/

B. SELECTION OF APPROACH:

There are many ways to find how users suppose the usability of applications: for example SUPR-Q (Standardize User Experience Percentile Questionnaire), CSUQ (Computer System Usability Questionnaire), QUIS (Questionnaire for User Interaction Satisfaction), SUMI (Software Usability Measurement Inventory). On the other hand, we used SUS approach because SUS (System Usability Scale) is very quick and it gives the very accurate result and gives efficiently distinguish between usable and unusable system.

SUS is a simple scale of usability that allows calculation on basis of the scale of 10 items, which gives us a subjective assessment of the usability of the software that we require to test. It was created by John Brooke in the UK at Digital Equipment Corporation in 1986 as a device to be utilized in usability designing [4]. System Usability Scale is a tool that determines the usability on a scale by asking or finding statistics of ten questions, which has answers ranging from one to five with strongly agree to strongly disagree [4, 12-14]. These questions can be seen as the difference in the alternative questions. One question is positive in perspective and the other is negative (Table III).

For this review records of publications were selected. The reason is that no more work on the user interfaces to evaluate e-government websites [3]. Along these lines, the need to audit the assessment strategies has expanded so that executed frameworks could be decided for their performance (usability).

TABLE III: SUS QUESTIONS

	The System Usability Scale Standard Version		Strongly disagree 1	2	3	4	Strongly agree 5
1	I think that I would like to use this system.		O	O	O	O	O
2	I found the system unnecessarily complex.		O	O	O	O	O
3	I thought the system was easy to use.		O	O	O	O	O
4	I think that I would need the support of a technical person to be able to use this system.		O	O	O	O	O
5	I found the various functions in the system were well integrated.		O	O	O	O	O
6	I thought there was too much inconsistency in this system.		O	O	O	O	O
7	I would imagine that most people would learn to use this system very quickly.		O	O	O	O	O
8	I found the system very cumbersome to use.		O	O	O	O	O
9	I felt very confident using the system.		O	O	O	O	O
10	I needed to learn a lot of things before I could get going with this system.		O	O	O	O	O

We will consider one of the e-government websites for our SUS to check the usability score that we get of the website based on types of users (Novice, Intermediate and Experienced user), will consider the website of PPSC**:** **www.ppsc.gop.pk**

The method used applying the SUS, comprises the framework development based on the overall results obtained. Initially,

different questions were selected of SUS for the survey. Then we organize a questionnaire on Google Forms. After generating the form, it is delivered to the members. All the responses of participants were received, and we utilized the responses for discovering a better e-government website.

C. SELECTION OF PARTICIPANTS

The 19 participants participated in this analysis review on an intentional premise. They are categorized into 3 types of users some are known by the website and frequently use this web they are called expert users, and some are intermediate and novice users. The Males were 13 while there were 6 females. We surveyed the questionnaire, which consists of 10 questions regarding e-government websites (SUS) was utilized for a reason to discover which e-government website is intuitive and user friendly. The members were given 10 questions. The members are mentioned to fill the appropriate responses as per their type of users.

III. RESULTS AND FINDINGS

A. CALCULATE SUS FOR PPSC WEBSITE

We developed a questionnaire on Google Forms by using the SUS, which obtain a rapid measurement of how users supposed the usability of the PPSC website

SUS SCORE: According to Methodology, the People category chosen for Survey (Fig. 3) is mainly three,

- People who use the PPSC website or they have been using other similar websites but they feel comfortable with the PPSC website (Experienced user), are denoted with a light blue highlight.
- People who are using the PPSC website and face minimum issues with the interface (Intermediate user) are denoted with a yellow highlight.
- People who are using the PPSC website for the first time (Novice users), are denoted with a red highlight.

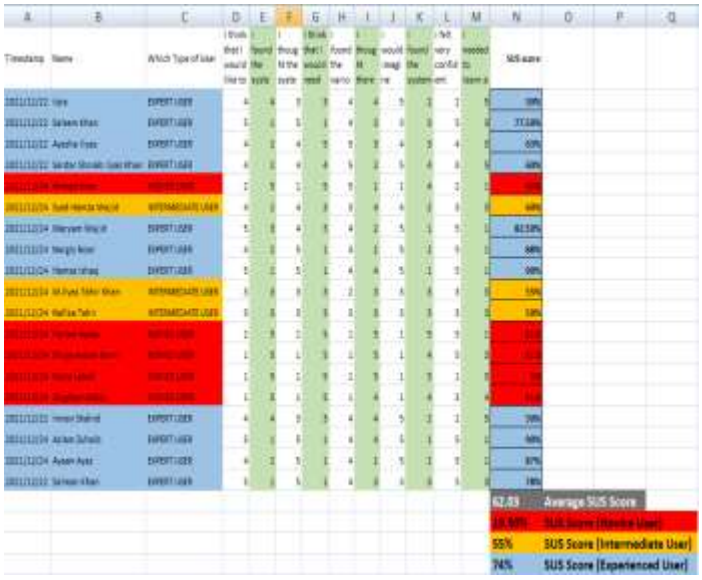

FIGURE 3: SUS SCORE RESULTS

If we consider the combined average of the SUS score, we get the result =62.03.

If we consider only for the novice user who has not ever used any E-Government Website the average score will be = 19.5

If we only consider the intermediate users the average score will be = 55.

If we only consider the experienced users the average score will be = 74 As you can see the result with the help of the graph (Fig. 4).

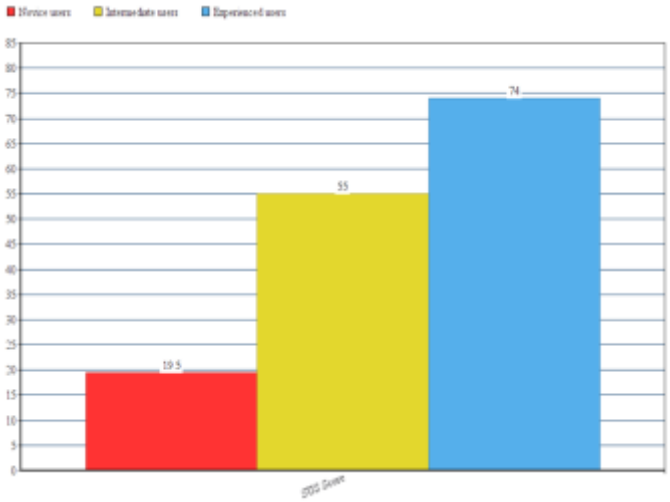

FIGURE 4: SUS SCORING GRAPH OF DIFFERENT USER

Considering the results, the application is quite OK for the users with prior experience of E-Government websites compared to the ones who are using the E-Government website for the first time.

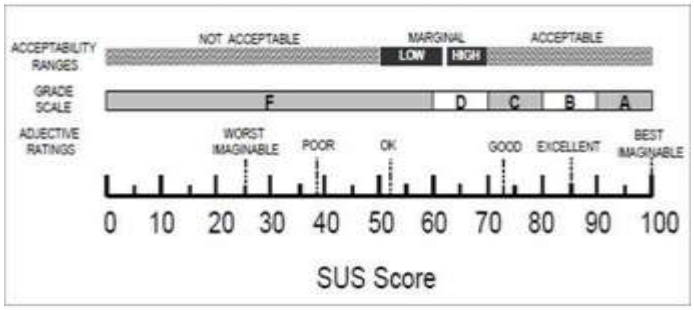

FIGURE 5: SUS SCORE SCALE

If we look according to the scale (Fig. 5) we get the results as (Table IV),

TABLE IV: RESULTS

SUS Scale	Combined Average	Novice user	Intermediate user	Experienced User
SUS score	62.05	19.5	55	74
Acceptability Range	Marginal	Low		Acceptable
Grade Scale	D	F	F	C
Adjective rating	Ok	Worst	Ok	Good

IV. Conclusion

The findings of this study suggest that members utilized the responses for discovering a better e-government website. According to our calculations, we had different results considering different users according to the experience that we have discussed. The limitation of this study is that usability evaluation is dependent on the SUS measurement technique, which is a 10-item questionnaire to measure usability. As you can see above results.

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