ANALYSIS of USABILITY ISSUES of Q-OBE: TEACHERS' PERSPECTIVE

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Abstract

The acceptance of a web-based application is dependent on its ease of use which is defined by the usability. And analysis of usability of a web-based application is helpful to learners and it also amplify the learning understanding of learners. The usability of a web-based software Q-OBE (Quality-outcome Based Education) [1] which is used by teachers in universities is analysed in this work. This software manages the whole academic cycle of every student on one platform. To measure the usability of Q-OBE, a survey is designed consisting of five attributes of Neilson usability model [2]. The purpose of this survey is to obtain teachers input on the usage of Q-OBE. This study is investigating usability issues of Q-OBE and providing recommendations for achieving more usable system of Q-OBE within university. It is evident from the survey results that the users of Q-OBE are not fully satisfied related to the Error, learnability and memorability attributes of Neilson usability model.

Keywords: Usability, Q-OBE, Neilson Model,

1. INTRODUCTION

It is imperative to measure the usability of software applications which are employed in the educational institutions. In simple words usability can be stated as ease of use which is a proportion of how well a particular user in a particular framework can utilize an app/platform to accomplish a characterized objective successfully. The design of usability depends on that how well can designed features fulfil the requirements of the user's needs and goals [3].

Today, technological development is evolving very fast, forcing companies to provide best system to improve the quality of the system to satisfy customers. Building a suitable system according to demands of customers is not an easy task to achieve, and after completion and deployment it must be analysed considering the usability issues.

This research paper is based on analyzations of cloud-based software Q-OBE (Quality-outcome Based Education) [2] which is used in universities by teachers. Q-OBE cloud-based software is used to improve quality of education. It is based on outcome - based education to fulfil Accreditation requirements of Washington Accord and ABET (Accreditation board of engineering and technology). Here is the link of washigton accord (https://www.ieagreements.org/accords/washington/).

This software manages the whole academic cycle of every student on one platform. Q-OBE manages records of every student in different interfaces like percentage form, GPA based, and in graphs. Overall Q-OBE shows that how much students are below 50% or above 50% and are exact at 50% to achieve CLOs(Course learning outcome) of a particular course. Q-OBE manages multiple subjects/courses and saves data in every interface with the year mentioned in it. All the teachers have their accounts for accessibility of Q-OBE with their credentials. Universities share reports/queries to the authorities like the Pakistan Engineering council. Every university management uses its account to create departments, batches, faculty, yearly enrolment and students. And every faculty/teaching staff adds activities like quiz, midterms, tests, sessional, practical's, labs, finals, and assignments of every individual student. Teachers have to specify which particular activity is covered by which specific CLO of the course. Teachers can set their CLOs as CLO1, CLO2, CLO3 etc, which is primarily based on that course. CLO have multiple options for activities. Q-OBE supports adaptable mapping of PLOs (Program learning outcome) with CLOs and mapping of CLO with numerous class activities. Finally, Teachers can generate GPA and CLO achievement results and export data in PDF or Excel form.

The paper is organized in five sections. Section II states some the literature work related to usability of applications. Sections III presents methodology adopted in this work. Section IV explains results and finally section V presents conclusion.

1.1 USABILITY MAIM FACTORS

There are different models proposed for analysing the usability issues of software. ISO 9126 Usability model [4] which represents engineering perspective on usability. It has six main quality character tics Portability, efficiency, Reliability, Functionality, Usability and Maintainability. MC calls Model or FCM (Factors, Criteria and Metrics). It provides three different perspective of software lifecycle Product operation, product revision and product transition. Further 2QCV3Q Model [5] was proposed it evaluates 7-dimension of quality of web/software which is Who-what-why-when-where-how and feasibility.

1. Effectiveness: supportive to users to achieve their accurate goals. It is all about achieving goals completely and accurately.
2. Efficiency: users can perform functions rapidly through the least conducting time or easiest way.
3. Engagement: Users think that it's charming to utilize and proper for its industry, subject or project, etc
4. Satisfaction: How much the client likes to utilize the framework? It is the client's uplifting mentality towards the framework. Fulfilment's measurement is the disposition scale.
5. Errors: How regularly client commits mistakes or errors while collaborating with the UI of the framework,

furthermore, how genuine these mistakes are taken as the serious problem.

6. Learnability: Framework should be understandable and easy so that the user can easily and rapidly understand and starts to perform his tasks without any hurdles.

7. Memorability: When client utilizes the framework, how effectively client retains the UI of the framework also, how effectively client can reuse the framework after a break.

2. LITERATURE REVIEW

This section presents some of the recent studies related to the usability of applications. Khan and Zia [3] have used questionnaire and focus group method and and concluded that computer-based training is very helpful in distance education. They also gave recommendations to improve the adapted system in the university. Kalimullah Khan [6] has used investigated method for specific mHealth apps and Think A-loud protocol technique. He concluded that usability solutions provide input for recommendations which helps in designs effective apps. Ali, Abdalha, et al. [7] used m-Learning platform prototype to measure usability technique MLA which is easy to use, attractive and enjoyable experience for all. Valuable to meet the usability needs.Anwar, et al. [8] taken interviews and surveys and fulfil questionnaire for collecting data and conclusion is that security courses of action are a necessary measure in the current frameworks.

Punchoojit and hongwarittorrn [9] used popular alternative to traditional form of retrieving information is menu method. Plays significant role in mobile satisfaction usage and concluded the exploration included ease of use assessment of rundown looking over styles and changed rundown designs. Zhang and Adipat [10] used major two methodologies which are field studies and laboratory experiments. Both have pros and cons. But this research paper uses both methods and collected data in MTA and concluded that it is basic to create and embrace proper examination procedures and apparatuses to assess the ease of use of mobile applications Hardly any investigations have zeroed in on ease-of-use testing of sight and sound applications. Benmoussa, Khaoula,et al. [11] used Nielsen attributes of usability (NAU) questionnaire and concluded that good usability of a web platform and ease in use, quality is effective, so users perform well.Marineet al. [12] used the technology based on three phase iterative user-centered method, at each phase of evaluation usability methods changed (observed: Question Discussions) and conclude medication reconciliation app is very useful, ease in operating and satisfying to the users.

In another study Oyebode,et al. [13]used sentiment analysis using ML methodology and concluded that based on positive factors which effects the usability of an app, negative factors may affect the effectiveness of an app. Chen, et al.[14] used BP neural network model and concluded thatpersonal users 'factors have no such remarkable impact on model satisfaction as platform availability. A structural equation model was built.

3. METHODOLOGY

The methodology of this research is consisting of five steps. In literature, diverse usability models are present. In this paper we choose Neilson Usability Model [2] for getting results of Usability issues of Q-OBE [1]. Neilson Usability model contains five main attributes of usability (Effectiveness, Efficiency, Error, Memorability and Learnability). In second step we have defined research questions according to Neilson usability model. The questions are presented in Table 1. In third step, focus group of this research is selected which are teachers of MUET, Jamshoro [15]. Fourth step of research comprises of collection of survey from the IT and non-IT teachers of MUET. Finally, results are analyzed, and usability issues related to Q-OBE are discussed.
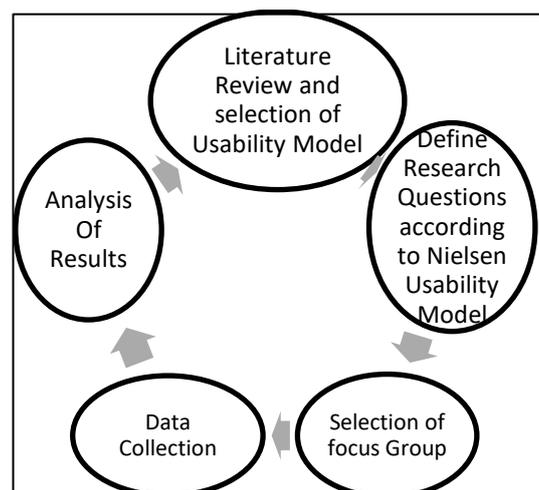

Fig. 1. Methodology of research

Table.1. Questions according to Neilson Usability Model

Usability Attributes	Questions
Efficiency	1. Entry of subjects, subject allocation, CLOs, PLOs is easy and completes quickly?
	2. Entry of students, activities and marks is easy and completes quickly?
	3. Visualization of achievement of CLOs, PLOs and GPA is understandable?
	4. Setting of GPA and OBE weights is easy and understandable?
Satisfaction	1. Are you satisfied with the entry of subject's allocation, PLOs and CLOs?
	2. Are you Satisfied with the entry the activities, marks, and students?
	3. Are you satisfied with the Visualization of PLOs and CLOs and Results?
	4. Are you satisfied with the setup of GPA and OBE Weights?
Error	1. Facing errors in entering the Subject allocation, CLOs and PLOs?
	2. Facing Errors in entry of students, activities and marks?
	3. The error messages presented by this system tell clearly how to solve the problem?
	4. Are those errors observed regularly?
Learnability	1. It is easy to understand and complete CLO and PLO achievements?

	2.	It is easy to understand the activities and student achievements in terms of results?
	3.	It is easy to visualize CLO, PLO achievements and GPA without entering the marks repeatedly
	4.	It is easy to visualize results in terms of GPA and OBE weights?
Memorability	**1.**	The organization of subjects, subject Allocation, CLOs, PLOs screen is memorable?
	2.	The steps or process of Q-OBE is memorable and simple to use again?
	3.	Use of Q-OBE is simple enough to memorize and facilitate the teachers to use the system without wasting time when returning to Q-OBE after a short break?
Open Questions	1.	In your opinion, what are the items, information or services missing from the system?
	2.	2.What are the possible improvements points?
	3.	Name of the Department?
	4.	Gender?
	5.	Teaching Experience?
	6.	Designation?
		From how many Semesters have been using Q-OBE?

4. RESULTS AND DISCUSSION

Nielsen generally recommends testing with 20 users when collecting quantitative usability measures [11]. The evaluation of the usability of Q-OBE [1] is completed by taking a survey of questionnaire from a sample of 72 teachers of MUET who are currently using it. The results of closed ended questionnaire consisting of five options are shown in table 2. It is evident that 50-64% of faculty is agreed from the efficiency of Q-OBE and 20-30% are not agreed from the efficiency of Q-OBE and rest of 14-20% are neutral about the efficiency of Q-OBE. 55-64% of faculty is satisfied from the performance of the Q-OBE and 17-20% is not satisfied from the performance of Q-OBE and rest of 17-25 % are neutral about the performance of the Q-OBE. 20-45% is faculty is facing errors during entering students, activities, and marks, 35-45% is not facing error situation and 20-35% is neutral. 50-74% of faculty is agreed with the easy understanding of Q-OBE, 17-29% is disagreed with the easy understanding of Q-OBE and 9-22% is neutral. 37-51% of faculty is agreed with the memorability of Q-OBE, 29-43% disagreed with the memorability of Q-OBE and 13-33% is neutral. Table 3 also presents results of closed ended questionnaire. Table 3 reveals that sample is comprised of 62% male and 38% female faculty. And 70% of the faculty has been using Q-OBE from 3-4 semesters. The survey is conducted from 11% professors, 22% associate professors, 23% assistant professors, 19% lecturers and 11% lab engineers and 13% teaching assistants. It is also revealed from table 3 that survey is conducted from 58% IT and 42% non-IT faculty of MUET because teachers of all departments are using Q-OBE for maintaining the records of their students.

Table. 2. Results of questionnaire related to Q-OBE from faculty of MUET

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
Efficiency					
Q1	13.2%	17.6%	19.1%	38.2%	11.8%
Q2	10.3%	16.2%	20.6%	47.1%	10.3%
Q3	7.4%	11.8%	11.8%	50%	14.7%
Q4	7.2%	21.7%	14.5%	47.8%	8.7%
Satisfaction					
Q1	5.7%	14.5%	24.8%	47.8%	7.2%
Q2	8.7%	11.6%	15.9%	58%	5.8%
Q3	8.7%	8.7%	17.4%	46.4%	18.8%
Q4	7.2%	13%	18.8%	53.6%	7.2%
Error					
Q1	14.5%	20.3%	20.3%	31.9%	13%
Q2	15.9%	27.5%	23.2%	24.6%	8.7%
Q3	14.5%	30.4%	34.8%	15.9%	4.4%
Q4	10.3%	25%	27.9%	26.5%	10.3%
Learnability					
Q1	15.9%	13%	20.3%	40.6%	10.3%
Q2	8.7%	13%	8.75	56.5%	10.1%
Q3	13%	13%	21.7%	43.5%	8.7%
Q4	8.7%	8.7%	8.7%	58%	15.9%
Memorability					
Q1	11.6%	17.4%	33.3%	33.3%	4.4%
Q2	7.4%	19.1%	22.1%	42.6%	8.8%
Q3	14.5%	29%	13%	33.3%	10.1%

Table. 3 Results of questionnaire from faculty of MUET

Name of the Department?	Information Technology Faculty TL, SW, ES, CS, EL, BM (58%)			Non-Information technology Faculty PG, Civil, EE, ME, BSRS, IN, MT, TE (42%)		
Gender?	Male			Female		
	62.1%			37.9%		
Teaching Experience?	1-3 years	4-6 Years	7-9 years	10-12 years	13-15 years	16-18 years
	15	9	10	17	9	12
Designation?	Professor	Associate Professor	Assistant Professor	Lecturer	Lab Engineer	Teaching Assistant
	8	16	17	14	8	9
From how many Semesters have been using Q-OBE?	1	2	3	4	5	6
	6%	6%	34%	36%	10%	8%

Table 4 depicts results of open-ended questionnaire. The users of Q-OBE have pointed out missing items of Q-OBE such as user friendliness. The users have also given

suggestions regarding the improvements of the Q-OBE such as ease of entry and access.

Table. 4. Results of open-ended questionnaire from faculty of MUET

Open Questions	Acquired Results			
In your opinion, what are the items, information or services missing from the system?	Error Messages	Subject deletion	Lack of learnability	All are okey
	Control to correct errors by teachers	Needs to improve its user friendly	Grade achievements	In the results so far there is no option of
What are the possible improvements points?	Complicated User Interface	Less User friendliness	In my perspective everything is good	Grading system based on total marks
	To enable the activity import options	Increase ease of entry and access	I have not understood the Q-OBE well	Errors are often occurring they should

5. CONCLUSION

The 70% of the MUET faculty has been using Q-OBE from the past two years and the usability analysis reveals that in general its use is satisfactory in Mehran University of engineering and technology Jamshoro. As per the responses of the faculty, results expose that most of the users are satisfied with the way it fulfills the required tasks. Further results shows that somehow the usage of Q-OBE is easy and understandable,however 45% of the users disagree that the error messages presented by this system tell clearly about the solution of the problem.

Q-OBE fulfil the requirements of OBE system. The responses of users regarding usability of the Q-OBE reveals that the visualization of CLO, PLO achievements and GPA without entering the marks repeatedly needs to be enhanced,error messages need to be improved and the use of Q-OBE is not simple enough to memorize if the teachers are returning to Q-OBE after a short break.

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