

# Measuring the Quality of User Experience on Web Services: A Case of University in the Philippines

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**Abstract**-User Experience (UX) is getting popular as a vital success factor across many sectors and industries, including educational institutions. It is the result of the interaction of the user, system, and context. Measuring UX is important for the purpose of having a good product or service. User Experience Questionnaire (UEQ) is one of the tools in measuring UX. It has six scales or attributes to be measured namely: attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty with twenty six (26) items in total. The goal of the study is to determine the UX of the web services for the students using UEQ. In the study, the researcher used the Misamis University Online Learning Environment (MUOLE) and My Misamis University (MyMU). There were 300 respondents who rated the two websites. It was found out that both web services gained positive UX scores on attractiveness, efficiency, perspicuity, dependability, and stimulation. However, novelty is neutral. Moreover, the results of the study provide additional ideas to the future development of the two systems.

**Keywords** - user experience; online learning environment user experience; measuring students web services;

## 1 INTRODUCTION

Many practitioners and researchers used user experience (UX) in various fields, and its research and development have been growing rapidly [1]. It is the result of the interaction of the user, system, and context [2]. It emerges as a main concern in designing a strategic plan for online vendors particularly for website owners to take advantage over such changing competitive landscape due to the advancement of internet technologies and sophisticated online users [3].

UX has many aspects to consider and ways of taking them into account like for example in designing interactive websites [4]. Further, the quality of UX in browsing a product has become a key differentiator for organizations. Thus, it affects whether the users purchased some products (on an e-commerce site) and their likelihood to return and recommend the website to their friends [5].

There are many kinds of frameworks for measuring user experience; one of them is the User Experience Questionnaire (UEQ) [1]. It is free to use and provides exceptional advantages. It can give an ample impression of the UX which includes the usual usability aspects to UX facet. Also, it shows a methodical tool to interpret the result accurately and contains six (6) scales (attractiveness, efficiency, perspicuity, dependability, stimulation, and novelty) with twenty six (26) items in total [6].

Although UX tools have been utilized to assess the products, there are still minimal attempts in evaluating the systems in higher education institutions (HEIs) such as learning management systems [1, 7] and few websites for student services.

HEIs nowadays have web services such as web-based portals where students can access resources, applications, personalized information, and education or academic options with which students can reach a range of sources whether internal and external, through a secure network [8]. Thus, evaluating these web services for students is imperative because the quality of the system's utilization may influence the learning performance of the students while learning online [1], trust in accessing the site, and the eagerness to use again the web service or browse the website.

The Misamis University (MU), Ozamiz City, Philippines has two main web services for the students namely: MisamisUniversity Online Learning Environment (MUOLE) and My Misamis University (MyMU). Both are accessible in the internet. MUOLE utilized Moodle which is a learning platform intended to offer educators, administrators, and learners with a single secure, robust, and integrated system to make personalized learning environments [9]. It is currently used by the faculty to deliver their instructions to their students online.

The MyMU is another web service that is utilized by the students to access their accounts, informative copy of their records which may contain subjects taken and grades, they can post status, and chat with their online

friends. User in this website must be a student in the university or at least enrolled before. The website was developed by the university's in-house programmers.

Measuring the user experience is important since it could give additional ideas to users' perception of the particular attributes of the system [10]. By performing it, researchers and technical personnel can formulate the requirements needed in developing and improving a system. It primarily focuses on selecting the most excellent design which ensures that the development of the software is in the correct direction, and much certain in fulfilling the users' needs [11].

Hence, this study aims to determine the user experience (UX) of the students while utilizing the MUOLE and MyMU websites. The UX is measured through its attractiveness, efficiency, perspicuity, dependability, stimulation, and novelty using UEQ. The results and interpretation are necessary to provide recommendations for improving these web services for the students.

## 2 LITERATURE REVIEW

### 2.1 Overview of the User Experience (UX)

User Experience (UX) becomes a significant area of emphasis in several industries, with increasing consumer demands for useful and usable technologies [12]. The concept of UX incorporates distinguished features such as effectiveness, efficiency, learnability with added standards such as joy of use, attractiveness, or aesthetics [13].

To design a product that is effective, it is essential to guarantee that the service or product gives an adequate user experience to all intended group of users. Thus, it is vital for public web services. Avoiding certain user groups such as older people, persons with disability, or persons with less education, discard the idea in using a public web service due to the fact that it may be has a too low user experience for them. Hence, it is vital to permanently regulate this quality aspect [14].

As user experience (UX) is getting a mainstream as an imperative achievement figure over numerous divisions and businesses, including educational organizations, it is exceptionally critical to quantify it [1, 12]. It is one of the areas that can additionally help to solidify client connections [15].

### 2.2 Current State of User experience (UX) Studies

There exist many user experience (UX) frameworks which are being used in various researches such as Standardized User Experience Percentile Rank Questionnaire (SUPR-Q), Questionnaire for User Interaction Satisfaction (QUIS), Software Usability Measurement Inventory (SUMI), System Usability Scale (SUS), and User Experience Questionnaire (UEQ). Each

of these frameworks has its objectives in measuring UX as well as advantages and disadvantages [1].

Most of these user experience frameworks are proprietary and a license is necessary to use them. For the evaluation of the general usability of a system, QUIS can be used, but it is not for free. QUIS is same with SUS. However, SUS is free and convenient to use especially in assessing software's usability. QUIS method of scoring is quite difficult and gives general result making it difficult to be conducted in deep analysis. But, QUIS leads in validation support availability compared to SUS because a user may exploit the support to validate accurately the results of the questionnaire [1, 16, 17].

The other proprietary frameworks, SUPR-Q and SUMI, give useful tools in analyzing the result of the questionnaire [1]. SUMI can measure a wide range of systems as to its quality of use [18] while SUPR-Q is a more specific in assessing websites. Thus, SUPR-Q allows the users to access the dataset of the various scores of the other websites for the users to compare their website score to the others [19].

However, compared to the four tools in measuring UX, User Experience Questionnaire (UEQ) delivers excellent benefits. It gives as well a far reaching impression of user experience. It likewise exhibits a scientific tool to precisely translate the results effortlessly. Best of all, it is allowed to use with no charges [1, 6].

### 2.3 User Experience Questionnaire (UEQ)

User Experience Questionnaire (UEQ) is one of the tools to measure UX. It enables faster and quick measurement of the UX of interactive products [20]. It is used in various research contexts such as for the assessment of business software, development tools, social networks, and websites and web services [13, 21, 22].

UEQ's items and scales were derived by a data analytical approach [1]. Currently, it is available in many languages [6, 14]. UEQ has six (6) variables namely: attractiveness, efficiency, perspicuity, dependability, stimulation, and novelty with twenty six (26) items in total. Figure 1 shows the scale structure of a user experience questionnaire (UEQ).

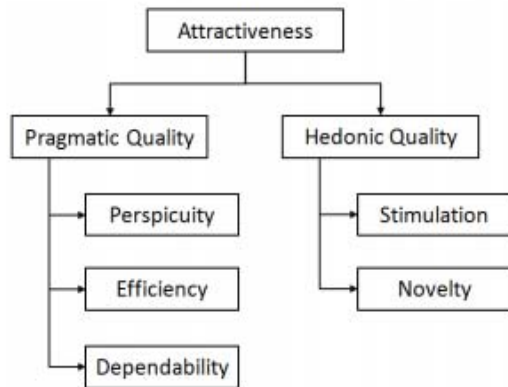


Figure 1. UEQ Scale Structure

UEQ's scales and their items were inferred by an information investigative approach. Thus, in the initial step, an arrangement of 229 possible items was created subsequently of two (2) larger group of usability specialists were having brainstorming sessions. By a specialist assessment with a similar arrangement of experts, the arrangement of possible items was lessened to eighty (80). At that point these eighty (80) items were used in a few researches which concentrated on the nature of intuitive products such as software package, cellphone address book, or business and online-collaboration systems. In general, the 153 participants' data were accumulated as essential informational index. The six scales and the 26 items representing the UEQ were at last extracted using factor analysis from the data. The six (6) variables or scales of the UEQ were the yields from the examination [20].

Further, UEQ can give a full impression of UX, going from customary ease of use viewpoints to client encounter point of view. It additionally has an explanatory device to translate the outcome precisely [6]. It is useful for continuous quality evaluation of software during the process of development [20]. Therefore, a UEQ measurement is collected in every software update [13].

According to the study of Rauschenberger et al. [13], the developers, managers, and user feedback are needed to improve a product. Thus, for developing good software, usability and user experience should be considered. In contrast, UX depicts the total impact of a product to the end-user. UEQ is a tool that is capable of continuous UX assessment of a product or service with a little effort.

In the investigation of Cota et al. [14], UEQ was used to have a speedier assessment. UEQ's scales are intended to include a wide range impression of a user experience. The questionnaire's configuration bolsters the moment a client or user's reaction to show impressions, sentiments, and mentalities that emerge when the expected users utilized the services or products. Also, the questionnaire

is short enough and can be filled out by a respondent in a few minutes.

### 3 METHODOLOGY

The research framework of the study (figure 2) starts from data collection in which questionnaire was given to the participants. The participants rated the two web services – MyMU and MUOLE. After the data has been collected, the researcher utilized the UEQ tool which is an excel file that allows the researcher to enter the data and automatically gives the results which are the baseline for interpretation.

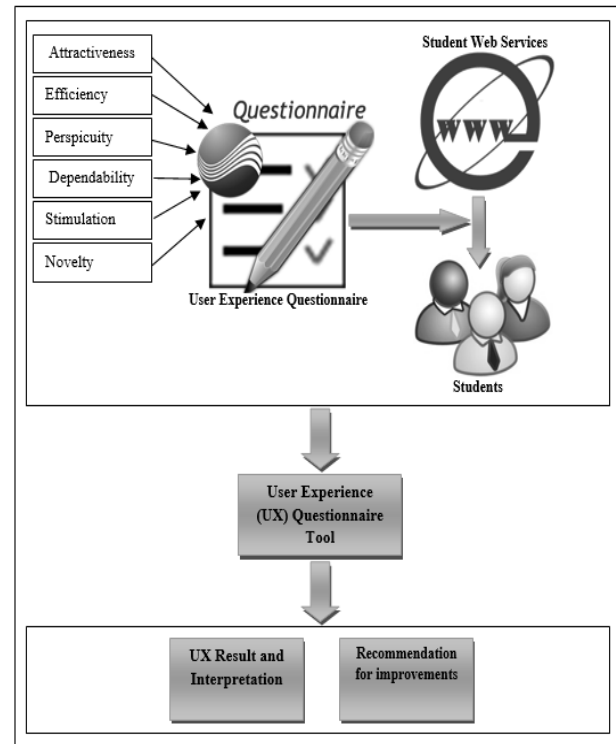


Figure 2. Research Framework of the study

#### 3.1 Questionnaire Development

The questionnaire has three main sections: (1) User Profile, (2) UEQ for MUOLE, and (3) UEQ for MyMU. In this study, the standard User Experience Questionnaire (UEQ) was not modified which means it has all the six (6) scales and a total of twenty six (26) items [6]. Thus, it measures the attractiveness, efficiency, perspicuity, dependability, stimulation, and novelty of the products (which in this case those are the MUOLE and MyMU). Table 1 defines the variables (which are actually the scales) and items used in the study which are adopted from standard User Experience Questionnaire (UEQ). Figure 3 shows standard UEQ.

Table 1. Variables used in the study

Variable / Scale	Definition	Items
Attractiveness	Common opinion or impression concerning the web services. This gives an idea if the users like or dislike MUOLE and MyMU.	1. annoying - enjoyable 2. good - bad 3. unlikable - pleasing 4. unpleasant - pleasant 5. attractive - unattractive 6. friendly - unfriendly
Efficiency	This measures if MUOLE and MyMU are efficient and fast. It measures how effective and organize the user interface of the two websites.	1. fast - slow 2. inefficient - efficient 3. impractical - practical 4. organized - cluttered
Perspicuity	A scale that shows how easy to understand MUOLE and MyMU.	1. not understandable - understandable 2. easy to learn - difficult to learn 3. complicated - easy 4. clear - confusing
Dependability	A scale to measure the security and predictability aspects of MUOLE and MyMU.	1. unpredictable - predictable 2. obstructive - supportive 3. secure - not secure 4. meets expectations - does not meet expectations
Stimulation	This measures if MUOLE and MyMU grab the interest and excitement of the users. It reflects if the user feels inspired or motivated in using further the two websites or web services.	1. valuable - inferior 2. boring - exiting 3. not interesting - interesting 4. motivating - demotivating
Novelty	Are MUOLE and MyMU innovative and creative? Do the two web services grab the interest of the users?	1. creative - dull 2. inventive - conventional 3. usual - leading edge 4. conservative - innovative

The pragmatic quality or goal-oriented aspects in the scales are the: (1) perspicuity, (2) efficiency, and (3) dependability. In the other hand, stimulation and novelty are hedonic quality viewpoints or non-goal oriented [23]. While attractiveness is the fact or condition of being prevalent and considered that the response of the users pertaining to the scale for attractiveness is formed from their response relating to the other scales [1]. The questionnaire's items are organized as a semantic differential where individual entry is comprised of a couple of words with inverse context.

	1	2	3	4	5	6	7		
annoying	○	○	○	○	○	○	○	enjoyable	1
not understandable	○	○	○	○	○	○	○	understandable	2
creative	○	○	○	○	○	○	○	dull	3
easy to learn	○	○	○	○	○	○	○	difficult to learn	4
valuable	○	○	○	○	○	○	○	inferior	5
boring	○	○	○	○	○	○	○	exciting	6
not interesting	○	○	○	○	○	○	○	interesting	7
unpredictable	○	○	○	○	○	○	○	predictable	8
fast	○	○	○	○	○	○	○	slow	9
inventive	○	○	○	○	○	○	○	conventional	10
obstructive	○	○	○	○	○	○	○	supportive	11
good	○	○	○	○	○	○	○	bad	12
complicated	○	○	○	○	○	○	○	easy	13
unlikable	○	○	○	○	○	○	○	pleasing	14
usual	○	○	○	○	○	○	○	leading edge	15
unpleasant	○	○	○	○	○	○	○	pleasant	16
secure	○	○	○	○	○	○	○	not secure	17
motivating	○	○	○	○	○	○	○	demotivating	18
meets expectations	○	○	○	○	○	○	○	does not meet expectations	19
inefficient	○	○	○	○	○	○	○	efficient	20
clear	○	○	○	○	○	○	○	confusing	21
impractical	○	○	○	○	○	○	○	practical	22
organized	○	○	○	○	○	○	○	cluttered	23
attractive	○	○	○	○	○	○	○	unattractive	24
friendly	○	○	○	○	○	○	○	unfriendly	25
conservative	○	○	○	○	○	○	○	innovative	26

Figure 3. The standard User Experience Questionnaire (UEQ)

### 3.2 Sample Selection

Table 2 shows the profile of the respondents. The study includes 300 respondents or participants who are students from Misamis University (MU). The respondents already experienced in using the Misamis University Online Learning Environment (MUOLE) and My Misamis University (MyMU). Specifically, the respondents are enrolled to any undergraduate and graduate programs of the institution.

### 3.3 Data Collection, Validity, and Reliability

The students were given access to the online questionnaire wherein they need to enter their profile and rate their user experience on the two web services. To come up with valid and reliable answers, the respondents were given a short orientation on how to deal with the standard questionnaire since the items were arranged in pair of terms with opposite meaning. The validity and reliability of the standard UEQ scales were inspected in various researches and showed that the reliability of the scales was sufficiently high [20]. Furthermore, the tool had been proven reliable to its consistency using Cronbach's alpha-coefficient [6].

Table 2. Participants of the study

Respondents	Description	Frequency
Undergraduate Students	These are students enrolled in IT, business, arts and sciences, dentistry, criminology, nursing, dentistry, education, maritime, and	257

	engineering programs or courses.	
Graduate Students	Students that are taking their masters generally in education, nursing, public administration, and business administration.	43

### 3.4 Data Analysis

The items of UEQ are scaled from -3 to +3. Thus, the most negative response is -3, neutral response is 0, and most positive response is +3. The figure that specifies a positive feedback of the users is above +1 while a negative impression is below -1. A typical range of -2 to +2 is considered for the observed scales means. If a mean of a scale is near +2, it reflects a good impression from the respondents.

UEQ analysis was basically led by computing the six scales' means. It excludes the whole score for the UX since factor analysis was used to develop it [20], it does not consider the calculation of the overall mean of all scales since this figure cannot be interpreted. In ordinary elucidation, figures between - 0.8 and 0.8 suggest a nonpartisan assessment, while estimations of figures higher than 0.8 delineates a positive feedback, and values not as much as -0.8 portrays a negative impression. Moreover, if the mean value for a certain scale is between 1.5 and 2, it signifies a high quality perspective for that scale [1].

## 4 RESULTS AND DISCUSSION

Using the UEQ tool and the data from the 300 respondents, table 3 shows the means of the four attributes for the evaluation of the MUOLE website while figure 4 shows its bar graph. The results depict that only the novelty attribute shows neutral evaluation while the other attributes got more than 0.8 which means a positive evaluation and users found the website to be attractive, perspicuous, efficient, dependable, and stimulating.

Table 3. Six Means of UEQ Scales for MUOLE

Scale / Variable	Mean
Attractiveness	1.689
Perspicuity	1.489
Efficiency	1.454
Dependability	1.282
Stimulation	1.603
Novelty	0.270

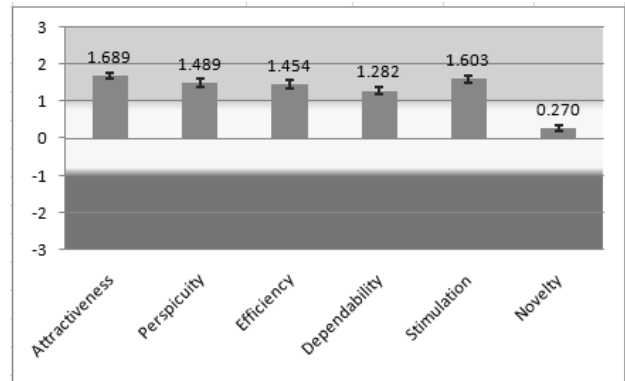


Figure 4. Bar Graph of the Six Means of UEQ Scales for MUOLE

Table 5 shows the means of the four attributes for the evaluation of the MyMU website and figure 5 shows its bar graph. The results present that still only the novelty attribute shows neutral evaluation while the other attributes have positive evaluations.

Table 5. Six Means of UEQ Scales for MyMU

Scale / Variable	Mean
Attractiveness	1.539
Perspicuity	1.445
Efficiency	1.214
Dependability	1.178
Stimulation	1.334
Novelty	0.272

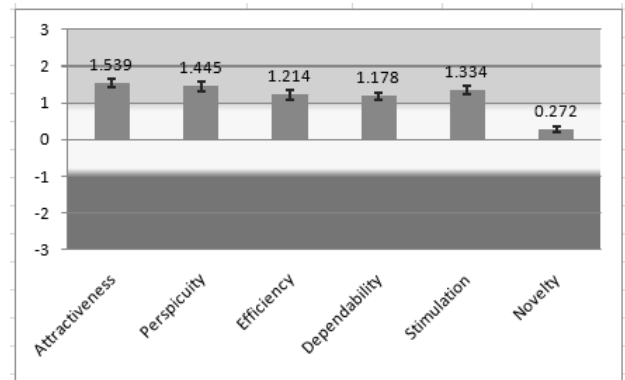


Figure5. Bar Graph of the Six Means of UEQ Scales for MyMU

## 5 CONCLUSIONS, LIMITATIONS, AND FUTURE WORK

It was found out that the two web services offer quality user experience to the student. Both suffice the

needs of the users. However, novelty aspect for the two websites earned very low. This might due to the fact that students or users do not consider it as a contributing factor for them to have a good user experience or they interpreted the items in the novelty scale in an unexpected way.

The results of this study can be used by the web developers as a reference to come up with a good design for the two websites or as a contributing factor for future improvements. For now, both websites have good scores; therefore they do not need further improvements.

However, the study has limitations in spite of its contributions. First, it considers only the web services offered by Misamis University (MU), Ozamiz City, Philippines. Higher education institutions (HEIs) may have different web services to the students. Second, the researcher did not consider the varying profile of the respondents such as age, sex, course, etc. as contributing factors that may affect user experience. Lastly, this study only utilized user experience questionnaire (UEQ) which did not include any qualitative analysis to counter check or validate the respondents' answers or ratings.

Future researches could involve other statistical tools in understanding or analyzing the user experience. Include other higher education institutions (HEIs) in the study. And have a huge number of participants or respondents.

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