Usability Evaluation of Selected Oman-based eCommerce Websites

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ABSTRACT— ***Since the advent of internet technology, e-commerce websites has become a common place for consumers to conduct business transactions. Having a user-friendly online system can make a huge difference in the successful completion of business transactions. Companies have employed different strategies in their web design so as not to solicit negative impressions among potential consumers. Thus, it is necessary to understand consumers' visual preferences and expectations. A web design that includes content, functional, and navigational elements must be well planned and carefully executed to provide a distinct user experience. Usability testing helps refine the user experience and validate web design assumptions. The best websites that dominate the market are those having excellent web design and offer great customer experience. Thus, on the part of the companies, it translates to more revenues.***

This primary purpose of this study is to examine the usability of three (3) Oman-based e-commerce websites which sell similar products. It made use of quantitative and qualitative data in its analysis which are gathered from conducting three (3) surveys: pre-task survey, post-task survey and post-test survey. This study measured the task time and success rates in the post-task survey and compared the mean and usability score of these websites. This study sought to determine some weak areas in the usability and design and recommended areas for improvements. Furthermore, the outcome of this study is hoped to provide web designers and developers gain a good understanding of consumers' behavior towards the use of shopping websites and employ better or alternative web designs that can improve user tasks and workflows. Most importantly, since the company websites that are evaluated are based in Oman, it will help Omani entrepreneurs meet some organizational targets.

This study revealed that one website needs serious improvement in its product overview and general usability factors, and critical improvement in its product search factor. This website was least favored in terms of its overall usability compared to the other websites which are identified in this study. The difficulty encountered by the participants has something to do with the search and navigational tools which are absent for this website. The other two (2) websites only need minor improvements in the aforesaid factors in addition to the other factors like terms of product description, accessibility of general conditions, handling of shopping cart, and self-descriptiveness factors. In general, all participants were able to complete the tasks in less time and difficulty. Lastly, this study produced recommendations for the improvement of the web design of the aforementioned websites.

Keywords— HCI, e-commerce, consumer behavior, usability

1. INTRODUCTION AND THE PROBLE

Since the advent of internet technology, e-commerce websites have become bigger and common places for consumers to purchase not only basic necessities but also luxury items. This market opportunity created a great demand for companies to put their business online. The best websites that dominate the market are those having excellent web design and offer great customer experience.

The Nielsen Global Survey of E-commerce of 2014 projected that business-to-consumer (B2C) e-commerce sales worldwide will increase by 20% by 2013 and reach $1.5 trillion in sales by 2014. Accordingly, the E-commerce Report (2014) reported that online purchase intention rates have doubled in three years [1]. The Online Shopping Behavior

Study conducted by MasterCard in 2012 and 2014 revealed that there is an increase in online shopping in Oman. Approximately 25% of these consumers, mostly in the 45-49 years age bracket, use online shopping [2][3]. Furthermore, half of these shoppers bought airline tickets, clothes, beauty products, medicines, coupon/deals and more. These shoppers prefer shopping from local websites. Mr. Aqueel Sulaiman, who is Roumaan.com's CEO, revealed that approximately 8,000 to 10,000 people visit their site every day [4]. Thus, electronic commerce, in the form of an online store, plays a vital role in Oman's economy.

Online shops can offer just about everything a consumer needs and wants. With the many benefits it promise such as secure payment transaction, cash-on-delivery option, enticing discounts and special offers, wide variety of products to choose from, express delivery with no or less charges, return policy and so much more, shopping experience has never been better in this digital age. There exist thousands of online stores, some of which are user friendly and some are not. The better websites are overpowering and making more profits than the others because of the application of new methodologies in their web designs. Having a user-friendly system can make a huge difference in the successful completion of a business transaction and crucial in the shopping experience of a user. In an article on Shopping Cart Abandonment Benchmarks, the data results from e-Commerce Benchmark Survey of 2007 with 1, 923 respondents presented the average shopping cart abandonment rate. The study revealed that more than half (50%) of the respondents never make it to the checkout. This high percentage of abandonment can be credited to many factors, one of which can be a website's usability factor. Web designers know that the human computer interface before a purchase is more important to the website's success than the actual purchase itself [5]. Users who are frustrated with the online shopping process seldom get to the point of actual purchase. Many companies have employ different strategies in their web design such as introducing a "What's New" feature, cross-selling and upselling, and improving the shopping cart and checkout process, cross navigational search and sending follow-up email to consumers who abandoned carts [6]. Interestingly, an online store may lose their income by just a single web form that is preventing consumers from purchasing products and the worst part is, designers may not be well aware of it [7]. Moreover, he stated that the problem lies even before the user can shop. He cited a good example on the design of a website's Registration and Login form. Some consumers believed that registering first before they shop is frustrating. Much more, some regular customers couldn't even remember their account details and so they jumped into a guessing game until they are fed up with numerous trial and errors. He further stated that there are about 160,000 requests per day for passwords. The aforementioned scenario is just one of the many problems that prevent consumers from buying in online stores. Web designers have long found a solution to this by simply putting a Continue button and not requiring customers to register if they opt not to, yet there are still some websites which doesn't follow this method. Good web design is important because it disallows website visitors to experience frustration and resentment [8]. Having a negative impression among potential customers will not help achieve company's business goals. Thus, it is necessary to understand customer's visual preferences and expectations. A website's information design, that includes its content, functional and navigational elements, must be well planned and carefully executed.

This primary purpose of this study is to examine the usability of three (3) Oman-based e-commerce websites which sell similar products. This study sought to determine some weak areas in the usability and design and recommended areas for improvements. This study also compared the mean and usability score of these websites. Furthermore, the outcome of this study is hoped to provide the web designers and developers gain a good understanding of the consumers' behavior towards the use shopping websites and employ better or alternative web designs that can improve user tasks and workflows. Most importantly, since the company websites that are evaluated are based in Oman, it will help Omani entrepreneurs meet some organizational targets.

2. THEORETICAL BACKGROUND

Usability is a construct that may be useful in evaluating websites and consequently developing better websites [9]. Usability is making something work well that even an average-minded person can understand without having to experience frustration over its use. This can be done by gathering information from them through surveys, interviews, task analysis, and other research methods. Users define 'usability' as their perception of how dependable, efficient, organized, user-friendly, and straightforward it is to accomplish tasks within a system. Equally, understanding user requirements is necessary in order to build a successful website. It is a crucial success factor in e-commerce.

Companies need to consider not only the aesthetic value of their website but also the operability (or usability). The first law of e-commerce is that if a user can't find the product, he/she can't buy it either [10]. If a website is unable to meet a user's expectation, then the web design is a failure [11]. Business targets can't be achieved if the needs of the website users are not met.

Usability testing helps refine the user experience. It helps validate web design assumptions and help companies achieve their targets. User experience is one of the common measurements for diagnosing usability problems and designing interfaces. Research findings prove that consumers are more likely to buy from an online shop with a user friendly system [12] [13]. They found out that the most influencing factor for online shoppers is the website design. The web design should fit to user expectation in terms of navigation, content, organization. A good web design is when intended users are involved in the design process, thus, the need for a usability test (usability.gov). It is imperative that online shops undergo usability testing for designers to develop an understanding of users' preferences and expectations.

There is a shift now for website design and development to be user-centered instead of organization-defined. Likewise, consumer behavior change over time especially in online markets, thus, online retailers need to periodically conduct user testing to answer the ever-changing needs of its consumers [14].

3. METHODOLOGY

Website Selection

The researchers pre-selected three (3) websites using a basic google search using the keywords: "online+shopping +in+Oman" and "Muscat+online+shopping". The researchers evaluated and filtered down the first three (3) websites, whose main operation is based in Oman. These websites are named henceforth as "W1" for the first website, "W2" for the website, and "W3" for the third website.

Participants

It takes only five (5) users to uncover eighty-five percent (85%) of the high-level usability problems [15]. Thus, this study conducted purposive sampling by testing five (5) participants who passed a screening test according to the target demographics. They were asked to sign a consent form that they agreed to partake in the study and a release form that permits the researchers to use the data obtained from them to be used in this study. None of the participants have purchased from the three (3) websites mentioned in this study.

Procedure

The researchers explained the nature and purpose of the study to the participants.

This study used quantitative and qualitative usability tests that allow participants to participate in a free-flow inspection and task-based inspection. Three (3) surveys were administered: a pre-test survey, a post-task survey and a post-test survey. They are described as follows:

Pre-test Survey:

Pre-test survey collected the participants' personal information and online shopping experience. This information helped the researchers understand the participants more.

The participants were asked to complete the pre-task survey for 5 minutes.

Post-task Survey:

The purpose of qualitative usability testing is to gather behavioral insights by watching the participants interact with the websites' interfaces. It is necessary to watch the participant's behavior on handling a website in order to be more informed on the manner of their engagement aside from their verbal and written comments.

The task scenarios given in this study followed the Nielsen model (2014) [16]. Each participant was asked to evaluate the preselected websites. The participants were asked to perform three (3) similar tasks having duration of five (5) minutes each for every website. The tasks were:

1. Browsing through the website following their own interest

This is a free exploration task. The participants were made to do a self exploration of each of the website for five (5) minutes and were instructed to take down notes regarding their general impressions of the website. The researchers wanted to know the general impression of the participant to the websites without having to measure a direct objective.

2. Finding a specific product

In this task, the participant is asked to find a certain product. The researchers wanted to know how a participant performs the task especially the particular methods use on search and navigation. The success rate and task time are measured.

3. Using the shopping cart

In this task, the participant is asked to purchase product(s). The researchers wanted to find out how a participant manages the ordering process. The success rate and task time are also measured.

The participants were asked to talk aloud as they performed the tasks. They were also made to verbalize their actions to allow the researchers to record the participants' thoughts and have an overall comprehension of each participant's behavior. The researcher-facilitator noted down the participant's verbal comments and observed the actions undertaken by the participants.

After the tasks for the qualitative survey were completed, the participants were asked to answer open-ended question that allowed them to narrate their experience and explain how they perceived the usability of the websites.

Post-test Survey:

After the qualitative usability testing the participants were asked to answer a usability questionnaire for each of the website. They were asked to answer a 47-point questionnaire from Usability Fragebogen fur Online Shops (UFOS) of T. Christophersen and B. Balazs. UFOS helps in assessing, evaluating and comparing the usability of online stores [17]. The Researchers have sought the permission and approval of the authors on the use of the questionnaire for this study.

This instrument is a seven-factor scale for measuring different dimensions of the usability of online shops. The seven-factor scale examines the product overview, product search, product descriptions, general conditions accessibility, shopping cart or ordering process, self-descriptiveness and general usability. These subscales can predict a user's evaluation of a particular online shop. UFOS is an appropriate predictor for a buyer's intention and decision to purchase. The total score is a global statement about the usability of a store. Both the reliability and validity of UFOS can be considered good from the consumer's point of view. It has Cronbach alpha values of up to .95. This study used a 5-point Likert type from 5 (Strongly Agree) to 1 (Strongly Disagree). The average of all means were computed for each website and served as the measure of usability for the websites.

The estimated time to complete the post-test survey for the three (3) websites will be 15 minutes per participant.

The use of the UFOS questionnaire in this study is to produce quantitative analysis to the usability of the websites of interest. UFOS is intended to be given at least 15 users to achieve a reasonable tight confidence interval. Nevertheless, this study relied mainly on the qualitative analysis as produced in the post-task survey rather than in the post-test survey.

Test Environment

All users used a desktop computer with a Windows Operating System and Internet connection. The post task survey was conducted in a laboratory where the participant and tester where in the same physical location. This provides a good opportunity for the testers to observe the participants. On the other hand, the pre-test survey and post-test survey were conducted as per participant's convenience.

Analysis

Data for the quantitative and qualitative usability testing were consolidated, reviewed and analyzed. The quantitative data was encoded in Microsoft Excel and descriptive analysis was used to analyze the data specifically to

determine the mean and standard deviation. Lastly, summary of findings, conclusions and recommendations were drawn from the qualitative and quantitative sources of information.

4. RESULTS AND DISCUSSION

Pre-task Findings

The researchers ensured that participants differ in gender, occupation, age group and online shopping experience as shown in Table 1. Four (4) out of the five (5) participants have full-time jobs with differing occupation and one (1) participant is a student. Three (3) participants are female and two (2) participants are male. The participants age ranges from below 30 to over 50 years old. The participants are categorized in terms of online shopping experience where three (3) are novices and two (2) have experience shopping online more than once.

Post-task Results and Discussion

Task 1

W1 and W2 have favorable impressions to all the participants. W3 is least favored because of its design. All participants agreed that at first glance W1 and W2 is very likeable in terms of its layout and choice of colors. Participant A and C expressed that W1 follows the same layout they see in high class online stores. It is well organized and visually appealing. Participants B, D and E expressed that indeed W1's web design can entice them to shop online. Unfortunately, Participant D find W1 to be a little complicated than W2. The participant disclosed that there were too much information in W1's homepage to be absorbed all at once. All participants expressed that although W3 has rich and fun colors and text, its layout still needs a lot of improvement especially when scrolling down to view the products.

Table 1: Participants Profile

Participant	Gender	Occupation	Age Group	Online Shopping Experience
A	F	Lecturer	36-40	Yes
B	F	Technician	41-45	No
C	M	Student	Below 30	Yes
D	M	Businessman	Over 50	No
E	F	Sales Analyst	31-35	No

Task 2

In W1, Participants A, C and E used the search box in finding the product. It took them less than 15 seconds to find the search box, type the product name and find the product whereas when Participants B and D navigated around the categories it took them approximately a minute to find the product. In W2, at first none of the participants used the search box instead they navigated using the categories. They were disappointed with this process because they found out that the website doesn't prompt them if the product is unavailable instead the website just shows them the homepage. Participants B and D realized this after several clicks and reloads, they thought there was a problem with their internet connection. Participant D gave up on the website. Only Participants A and E found an alternative way by using the search box. After typing the name of the product, only then they found out that the product is unavailable. It took all the participants at most five (5) minutes to explore and find out that the product is unavailable. In W3, all participants expressed their frustration because they can't use a search box and predefined categories for searching instead they need to search the product one by one in linear fashion. They found the product in less than 1 minute because it is noticeable and situated near the top of the webpage.

Task 3

The participants were satisfied with the shopping cart/ordering process for the three (3) websites. These websites allowed them to modify changes to their shopping cart. Participants A and C liked the idea of having the

registration at the end of the shopping process. All participants were able to complete this process in less than two (2) minutes.

Post-test Findings

Table 2 shows the post-test survey result. It lists down the seven (7) factors as defined in the UFOS with the corresponding mean scores for each websites.

Table 2
Post-test Survey Result

Factor	Mean		
	W1	**W2**	**W3**
1. Product Overview	4.15	4.05	2.75
2. Product Search	4.26	3.83	1.43
3. Product Description	4.20	3.45	3.00
4. Accessibility of general conditions	4.00	3.75	3.23
5. Handling of shopping cart/ ordering process	4.20	4.32	3.68
6. Self-descriptiveness	4.20	4.18	3.60
7. General usability	4.20	3.89	2.58
USABILITY MEAN SCORE	**4.17**	**3.92**	**2.59**

Product Overview Factor

Product overview factor describes how products are grouped into useful categories and positioned in a meaningful way, how products listing pages are clearly laid out and how the user always know what the product cost.

As shown in Table 2, W1 and W2 have high means (4.15 and 4.05, respectively) in this factor except W3 (Mean = 2.75). In the post-task survey result, all participants agreed that the products are properly arranged and positioned in W1 and W2 but not in the case of W3. The researchers observed that the participants viewed the products one by one with no particular order. All participants expressed their frustration in W3 which garnered the lowest mean score among the three (3) websites. For them there is no known organization and categorization of the products. Furthermore, the participants stated that they were expecting parent categories in the home page instead they were shown a listing of all the products in random order. Additionally, all participants agreed that there are too much whitespaces in W3.

Grouping subcategory options in drop-down menus and other areas is important in items manageable and searchable; and most websites have done so [14].

Product Search Factor

The product search factor describes how the search functions can easily be accessed and used in the Web store and finds specific products easily. Moreover, it describes how the search function makes use of categories and product names and gives useful results. Likewise, it describes how it is easy for the user to find out if the web store has product availability or stock.

The product search means for W1, W2, and W3 are 4.26, 3.83, and 1.43 respectively as indicated in Table 2. All of the participants find it difficult to find the product they like in Website 3, which explains the low mean score, as there is no search facility. As agreed by all participants, product search is easier in W1, having a high mean score, which uses an enhanced search technique using checkboxes and a basic search technique using a search box. W2 uses only the latter and it is not wide enough to allow a long text query. In Jakob Nielsen's study, short boxes that allow typing a long query is difficult for the users to edit what they typed. The ideal search box should be 27-characters wide [19]. Likewise, it was observed that it took at least 15 seconds for all participants to find the search box in W2 because it is not strategically

placed in a convenient location. Accordingly, it was observed that users used their intuition to find the first reasonable option in searching for an item. When they see the first link that might lead them to that item, they click on it.

Semantic search hints improve search performance and boost a user's confidence that they their queries would generate good results (usability.gov). Only W1 has semantic search hints available.

Product Description Factor

The product description factor describes how the user can specify the desired characteristics of the product he/she is looking for, check whether the product meets his/her expectations, confirm whether product pictures are helpful to him/her and find out whether the product description meets his/her satisfaction.

All participants affirm that W1, W2 and W3 (with mean scores of 4.20, 3.45, 3.00, respectively) present good pictures and product descriptions. Participant A noticed that unlike W2 and W3 which present only a single picture per product, W1 presents several photos with zoom in facility as well as customer reviews. Most buyers read features and product specifications. Product description should be written in a way that convinces customer that it is a need rather than a want. The goal is to catch the attention of the customer and make him buy the product.

Participant C observed that the product descriptions for these websites are very direct and formal. He noticed that only W3 attempted to write product description that is the same as an agent selling a product face-to-face to a consumer. Product descriptions should be written similar to a conversation with a sales agent.

As observed, only W1 and W3 provide customer reviews and discussion forums for its customers. In the Nielsen Global Survey of E-commerce of 2014, 71% of the respondents who are global online shoppers like to read online reviews prior to purchasing a product and 61% of the respondents spent considerable time researching products before buying which they get by reading product reviews, forums, and description and looking at product images.

Accessibility of General Conditions Factor

The accessibility of general conditions factor describes how the web store displays and handles information regarding personal data, terms of delivery, delivery time, shipping and handling cost, payment options, return policy, and other business terms and conditions.

Every shopping website is generally required to display the general conditions such as terms of delivery, privacy policy, shipping and handling information, payment options, return policy and other terms and conditions. As observed, W1, W2, W3 provide these conditions to their user (with mean score of 4.00, 3.75 and 3.23, respectively).

Handling of Shopping Cart/Ordering Process Factor

The handling of shopping cart/ordering process factor describes the order and management of the shopping cart – placing orders, changing contents, displaying instructions and prompting users.

The three (3) websites provide an ordering process to some varying extent. The handling of shopping cart or ordering process for these websites have mean scores of 4.20 for W1, 4.32 for W2 and 3.68 for W3.

Self-Descriptiveness Factor

The Self-descriptiveness factor describes how the user is able to understand and navigate without the need for explanation.

The three (3) websites were perceived to have good self-descriptiveness factor having means of 4.20 for W1, 4.18 for W2 and 3.60 for W3. The participants were able to navigate around the three websites with less prompts and explanations from the researcher-facilitator.

General Usability Factor

The general usability factor describes how information is obtained, accessed and managed. It also describes how design makes it easy to use the Web store and how purchase can be completed quickly. Additionally, it describes how the Web store is easy, learnable, navigable, organized and uncomplicated which prompts user to explore it more.

As observed, Registration in W1 is variable; users can register upon checkout or anytime they want to sign in. This provides flexibility of choices since users prefer to sign in only when they want to buy something from a certain website. W2 and W3 asked users whether they are already registered members or not. W2 shows an intermediary (pop up) window that can be closed in an instant when the users do not opt to register whereas W3 shows it in their homepage and provide a link for users if they opt not to register.

All participants stressed that W1 and W2 (with mean scores of 4.20 and 3.89, respectively) are better than W3 in terms of layout and organization. They further revealed that W1 makes them want to explore further because they are drawn to its aesthetic design. They all agreed that W1 is the most visually appealing among the three (3) websites. In a study conducted by Lindgaard and her team in 2006, it discussed that participants form impressions of website visual appeal in as little as 50 milliseconds [20]. This fraction of a second impression is essential in attracting the interest of costumers and inviting them to purchase.

All participants agreed that W3 (with mean score of 2.58) makes it difficult for them to determine where to go next after their home page is viewed. They have to guess and randomly press clickable items to discover where to go next. User interface is one of the many things that a user considers in a website. A good user interface translates to a good user experience.

5. CONCLUSION AND RECOMMENDATION

This study has reviewed three (3) websites of interest in Oman. It has identified strong and weak areas in their design by using users of varying backgrounds to evaluate their system.

This study revealed that one website needs serious improvement in its product overview and general usability factors, and critical improvement in its product search factor. This website was least favored in terms of its overall usability compared to the other websites which are identified in this study. The difficulty encountered by the participants has something to do with the search and navigational tools which are absent for this website. The other two (2) websites only need minor improvements in the aforesaid factors in addition to the other factors like terms of product description, accessibility of general conditions, handling of shopping cart, and self-descriptiveness factors.

Furthermore, this study provides recommendations, which can improve the websites, as follows:

All three (3) websites do not have certain products listed in multiple categories in case users are confused in which category he/she must look at. The danger in this case is that when a user choose a certain category and finds out that the product he/she is looking for is not there, he/she might assume that the product is not being sold or out of stock. As a recommendation, these websites should place products in multiple related categories. For instance, a headset can be placed under Computer and Accessories category as well Electronics category.

W1 and W3 both employed a What's New (or "New Arrivals" or "Ïn Season") feature to some extent. W1 displays in their homepage current product deals and bestsellers while W3 displays only a single product in their What's New deal. W3 can be further enriched by displaying multiple products in their new deals section. W2 displays only their products without a What's New feature. The importance of this feature is that it allows user to check out new stuff which are on sale and most of the time, users check out best buy deals.

These three (3) websites do not have upselling and cross-selling features. A website can suggest supplementary products after a user selects a product he/she is interested to buy. For instance, when a user clicks on a mobile phone, a website can suggest mobile accessories for the phone. This is called cross selling where users are given options to add more related items to his purchase. This is also considered as a smart advertising on the part of the company because it can increase sales by allowing users to be given an idea that there are accessories available for the product(s) he/she purchased. Suggesting the users with alternative or substitute products keep the user engaged. Employing a cross sectional navigation in a website help users in searching for products Upselling is a technique used in sales where a customer is given options to buy the more expensive products. This can be seen in some websites that have sections named, "May we suggest", "Customers who bought these also bought these", "Complete the look", "Recommended for you" and the likes.

All three (3) websites doesn't have "Recently-viewed items" feature that allows a customer to return to the items he/she previously viewed for product comparison or possible change of mind. It is like creating a history of actions. The user is saved from remembering all the past actions he/she performed. Items of interest must be easily retrievable whenever a user needs it.

Interestingly, only W3 has a select language feature. A website must have a language option which the user is comfortable using with especially if a greater portion of a website's market is non-English speakers.

W2 and W3 may provide product reviews since some buyers look for suggestions on what to purchase. Their buying decision is often influenced by good reviews of products.

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