Original Research Article

Usability Evaluation: Zomato a restaurant search and discovery service website

Abstract

Usability evaluation for Zomato website helped in learning a lot of information about how each participant varies when interacting with a website although everyone's common interest is finding restaurants which serve delicious food. Very surprising factor was that website provides various locations and restaurant search yet there were few participants were unable to find few locations. Never expected that participants will search for remote villages and legacy restaurants, this is great find for Zomato website to update their locations list. Zomato should not stick to "one size fits all" concept by providing only limited restaurant information, because there are many food enthusiasts who have different tastes, locations, cuisines, their preferences etc. Participant's response for using the website for future restaurant search was unexpected because everyone did not agree to use the website for future use. This implies that website's ease of use, effectives, learnability etc is not sufficient to attract customers to use the website instead more emphasis should be on user satisfaction in providing more content relevant to customer's needs. One of new emerging design issues is content management which should be given the majority importance by the website designers in near future (Downing & Liu 2011). Zomato website should add more restaurants specific to the location and keep updating every new restaurant launched in the market. As this usability evaluation was conducted with three participants a repeated evaluation of this website will use more than ten participants, automation tool for web usage analytics, the test environment will be more elaborate with cameras setup and most importantly heuristic evaluation methodology will be used additionally to capture accurate results of usability evaluation.

Introduction

Background

A system whose functionalities are working as per expected is a working system, to meet functionality it is very much important to make sure that the system is usable (Benbunan-Fisch, 2001). In simple terms usability is defined as the extent to which something that be used without any hardship or user frustration. Here something used is a wide range of facilities, services or products used for example traffic signals, mechanical tools, software, hardware, books, cameras, mobile phones, interactive screens, websites etc.(Rubin & Chisnell ,2008). Usability is not confined to one field it is widespread such as psychology, art, philosophy, hardware, software etc. The main criteria of usability is make sure that the users using the product can learn it as ease, effective to use and are happy using the product, further this leads to the main goals of usability which are effectiveness, efficiency and ease of use (Preece, Sharp & Rogers 2015).

Rewinding back to 1970 and before usability was mainly revolving around the effective usage of documentation such as factsheets, brochures, regulations, leases, utility notices etc. where the important aspect was how effectively will the user be communicated (Redish & Ginny, 2010). Initially usability was nothing but a user experience. A person with little knowledge be able to use a thing without any problem , which means whatever the user is using is just working fine and the user is not frustrated for example operating a mobile phone, ticket check in kiosk and many more (Krug, 2014).

Description of the product

Zomato is one of the leading online website which is mainly used for restaurant search and guide. Up-to-date information given to the user about the restaurants specific for a given place. It is not confined to a restaurant search rather gives wide variety of niceties such as restaurant reviews, menus, photos, approximate cost, book a table, order online, hours of operation, main highlights, address, cuisine type the restaurant offers. All the information provided is mainly contributed from public who are food enthusiastic or passionate bloggers or users in general who want to offer their genuine opinion about the food experience from a recent restaurant visit or restaurant owners who want to promote their business. Started in the year 2008 in India, it slowly spread in many countries within a span of few years. It now operates in twenty-three countries covering India, Australia, USA, Canada and parts of Africa, South America and Europe. In 2015 it acquired Urbanspoon (one of leading restaurant information and recommendation service based in North America) and made its grand entry in USA market. Zomato acts a medium of providing detailed information both positive and negative which is beneficial to users. This website is mainly used by food bloggers, restaurant owners, food enthusiast, public etc.

Purpose

The purpose of this usability evaluation is to test the efficiency and effectiveness of zomato.com when used by users with minimum technical knowledge to search, book a table or order food from the restaurants of their choice. The study conducted will give information about learnability, satisfaction and errors when the users do tasks such as search for restaurants based on cuisine , type of meal, place etc., access the restaurants and their reviews, view the restaurant related photos and book a table for a specific date.

Problem

Zomato website was launched into the USA market in 2015 to offer restaurant search to users. The main goal of Zomato is to allow users to discover restaurants even before they plan to visit one by viewing the restaurant photos and reading the reviews. It is unclear whether the restaurant search results, details, information and options provided are useful to the user. Can the user rely on the information provided? However if the website does not give consistent information about the restaurants and if the options available for restaurants is not the same for all the countries this will have negative impact to use the application. This application provides a lot of options for restaurant search with no user guide available. There are features available in the user interface which show to do certain task but when accessed has no specific purpose of using it.

Test Goal and Objectives

- Can the user easily find the important options such as place and search box in the home page? (efficiency, learnability)

- Can the user search a location of their choice? (efficiency, effectiveness, satisfaction)
- Can the user view restaurant name they are searching? (efficiency, effectiveness, satisfaction)
- Can the user view the cuisine they want to select? (efficiency, effectiveness, satisfaction)
- Can the users navigate to the selected restaurant of their choice? (efficiency, effectiveness)
- Can the user book a table for a restaurant? (efficiency, learnability, effectiveness)
- Can the user order food online for a restaurant? (efficiency, effectiveness learnability)
- Can the user use detect place before ordering food online for a restaurant? (efficiency, learnability, error)
- Can the user benefit from the breadcrumbs options available on every page for navigation? (efficiency, effectiveness)
- Can the user read the reviews of the restaurants they want to visit? (efficiency, satisfaction)
- Can the user view the food pictures of the restaurants they are interested in? (efficiency, effective satisfaction)
- Can the users rely on the restaurant search and reviews provided? (efficiency, satisfaction, learnability)

The main aim of conducting this usability evaluation is to measure the usability metrics of the website zomato.com. As this application is mainly concerned with food related restaurants web interface and user's interaction with the interface forms the crucial part. For example the information provided in the website portrays how the user perceives the details such as satisfied with the information, not satisfied or wanting for more details etc. Evaluating many such criteria forms the crux of this study in contributing valuable information to Zomato in improving the usability of their website.

Participants and User profile

The standard sample size for any evaluation methods can range from 20 to 12 participants, however three participants is more than enough to find 91% of the usability problem and including an expert is optional (Alroobaea & Mayhew, 2014). Total of three participants were considered for this usability evaluation and the duration is one hour for each participants. Following criteria(s) were considered when selecting the participants

- General knowledge of reading English
- Basic understanding of using web
- Comfortable working in using laptop/computer

Each of the participants agreed for the evaluation testing on the dates mentioned below:

Participant 1: April 10, 2017 at 4:00 PM
Participant 2: April 12, 2017 at 5:00 PM
Participant 3: April 9, 2017 at 8:00 PM

There was no restriction for any participant who participated. Each participant was rewarded at that end of the evaluation procedure. Clear instructions about the procedure of the evaluation were briefed before the test. All the participants were asked to sign the consent form.

Test environment

Researcher's spacious reading room at Miami, Florida place was finalized after participant's confirmation. Reading room was chosen as an ideal test environment as it facilitated all the amenities from quite space, no distraction, comfortable seating, and perfectly placed laptop on desk to perfect room temperature control of participant's choice. Couch was provided as an option if the participant changed their mind not to use the chair. Apart from this an extra chair is used for researcher. The laptop will be up and running before the participants starts the evaluation process. Zomato website's home page will be opened and kept ready for the participant. To setup the environment it takes not more ten to fifteen minutes. The main intention of this evaluation is to observe the user interactions with the website. As the participants interactions will be observed by the researcher in person no camera is setup for video recording. Maximum care is taken so that both participant and researcher are not distracted but we can never predict any unforeseen intangibles. Following are details of the laptop used.

- Name : Lenovo ideapad 310
- Operation System: Windows 10
- System Processor: AMD A10-9600P RADEON R5
- Installed memory (RAM): 12.0 GB
- System Type: 64 bit operating system
- Web browser: Google chrome

Role(s) of the Researcher

Although the main focus is on the participants in this usability evaluation for collecting valuable data of the usability metrics, researcher plays a more important role as well. Researcher's role for this evaluation is pre-planning for the test to be conducted, good understanding and experience with user interface, selecting the participants, set up test environment, greeting the participants, support the participants, inquiring, and data collection. The researcher will teach the participants and lead them during the evaluation process. Here leading the participant is more important because researcher should make sure that the participant performs the tasks with less intervention of the researcher's step by step instructions. If the researcher is giving all the steps to perform a task to the participant then participant's actual interaction with the interface cannot be accurately captured (Rubin & Chisnell, 2008). Researcher is well prepared to be a good communicator, observer, motivator, handle participant's frustration, understanding, good listener, learner and open to face and solve any uncertainty during the evaluation. Participants can range from experts to apprentice; hence the researcher should be prepared to handle any situation. In certain situations researcher will indirectly play the role of a participant.

Literature Review

The user's understandable interaction with the system through an interface without any misinterpretation as long as the user wishes to continue using the system is the main agenda of usability (Benbunan-Fisch, 2001). User communication, problem solving, understanding and memory these user characteristic's rapport with the system is defined as usability (Goodwin, 1987). The five characteristics of usability are ease of learning, error frequency, memorability, efficiency of use and personal satisfaction (Nielsen, 2000). Usability factors are plentiful and various so are the benefits of usability where research studies have confirmed that usable systems

reduce errors, increase productivity, improved user acceptance and reputation, subject to minimal or no training (Lallemand, 2011). With so many benefits it clearly shows how important is usability. The tremendous increase in technology growth in all angles is forcing everyone to give importance to usability, as everyone wants their product to sustain in market for long period of time and this is possible only when the product is usable (Tullis & Albert, 2008). The user's identification with the usable system is linked with user satisfaction, the better the usability there is increase in user satisfaction which in turn helps in user loyalty toward the system (Flavian, Guinaliu, & Guerra, 2006). Organizations can have huge revenue losses due to usability problems in their website (Whitehead, 2006). The website's reason for success is majorly dependant on usability (Aziz, Kamaludin, & Sulaiman, 2013). Company's can run out of business if the product the user is planning to buy buying is complex to use as the user is not satisfied with the product which will end up not being purchased, hence usability forms the key to success of an company (Nielsen, 2000). Although the basic characteristics of usability model are effectiveness, efficiency, learnability and satisfaction, there is security which was included in enhanced usability model because in fields which deal with medical devices and nuclear power security plays a major role for the user (Abran, Khelifi, Suryn, & Seffah, 2003).

There is a close alliance with software engineering as both are concerned with the quality of the product with either of them having their own perspective of getting the best out of the product (Abran, Khelifi, Suryn, & Seffah, 2003). Hence software experts and usability experts should collaborate to develop more robust methodologies related to human computer interactions and software engineering, in recent years this partnership has been tremendous with amazing usable systems launched in the market (Sheffah & Metzker, 2004). With respect to website usability web engineering plays a major role (Sheffah & Metzker, 2004). The concept of usability engineering comes in place when designing a web page which is the core reason for an organization's website to reach greatest apex (Downing & Liu, 2011). Why are researchers giving great importance to usability with respect to web site? The answer is simple millions of people are hooked to internet every second which means one of the majorly used medium in getting the user's work done on internet is website, they might get access to these websites from mobile phone, laptop, desktop etc. It is highly important to continuously re-design, maintain, and update these websites with usability concepts so that the users adhere to their website in a long run which helps in organization's critical success.

As Human computer interactions field has been consistently helping in building usable systems, however usability testing involves gauging and detecting flaws in human computer interaction's characteristics (Levi & Conard, 2008). Usability testing in website is conducted to help perk up the user interfaces and also find the real usability problem faced by the users in achieving usability goals (Redish, Bias, Bailey, Molich, Dumas & Spool,2002). Before designing an interactive system the important aspect is identifying usability goals, which mainly focuses on achieving usability criteria such as how effectively a system can be used (effectiveness), maximum productivity (efficiency), how safe is the system to use (safety), easy to grasp the functionalities (learnability), benefit of using this system (utility) and ease of remembering the usage of the system (memorability) (Preece, Sharp & Rogers 2015). Usability testing helps to improve or re-iterate design based on different life cycles of the web site creation (Manzari & Trinidad-Christensen, 2006). Usability evaluation is not only applicable for a website yet to be developed, it tremendously useful at any stage of development rather even after the website is

running in production for many years or recently launched, it gives a sense of hope and scope for improvement of design and in finding any faults (Hallahan, 2001). Why so much of importance to website usability? Initially website's were very easy to use and uncomplicated as the user's needs and demands increased website's user interface also advanced , hence receiving feedback about website usage became more complex(Atterer, Wnuk & Schmidt,2006). Hence usability testing is widely used to measure user's experience when they interact with the system which helps the company to be successful in the market (Hertzum, 2016).

There are many usability methods to conduct a usability evaluation, choosing the correct method is important depending on usability criteria and goals you are interested in discovering. Basic usability testing methods are comparison exploratory test, true experimental study, observational qualitative study, among these exploratory comparison test scores high on the list to produce best results (Rubin & Chisnell, 2008). At the first stages of usability research the four basic usability evolution rules are automatically run by a computer, formal analysis, experiments conducted on test users empirically and heuristic evaluation which includes a procedure to evaluate the interface based on user's opinions (Nielsen & Molich, 1990). As the technologies have evolved so have usability evaluation methods. Which is a good usability evaluation method relevant for web applications? Although automated usability evaluation has been a popular cost effective evaluation method used there are very interesting new evaluation methods used such as cognitive walkthrough for the web (CWW) method used to evaluate website user navigation and search functionalities, MiLE+ to measure website's efficiency, performance and level of difficulty to learn and most common evaluation methods are cognitive walkthrough and heuristic evaluation (Insfran & Fernandez, 2008). User accessing a website faces certain barriers in using the website leads the user to stop using the website, possible negative review is given to others and this usability problem determines the critical success of an organization (Salaam & Khan, 2013). Web usability management model (WEB-UMM) is a proposed model in evaluating level of usability for websites which help organization's critical success and explore user barriers, this model is intended for website development in industries (Salaam & Khan, 2013). Usability guidelines implemented by Microsoft is Microsoft Usability Guidelines (MUG) which uses heuristic evaluation methodologies as a base, the list of guidelines and its subcategories used for its website is as below

- Content
    - Perseverance of the content to main users
    - Apt usage of multimedia
    - Depth and breadth of the topic presented
    - Up-to-date information displayed in the website
- Ease of use
    - Whether the websites main goal is met
    - How well organized is the website
    - Timely feedback with respect to user interaction
- Promotion
    - Forms the critical part of the guideline as this helps in attracting users to visits the website often
- Made for the medium

    - Motivate users to join user groups
    - Personalization
    - Refinement to update with current development
- Emotion
    - Challenge with respect to accomplishment of tasks
    - The website user interface having an effect in attracting users
    - Character based on people's view towards the website
    - User's control with the tasks being performed.

The authors fantastically explores with deep synthesis about the various evaluation methods which evolved over time, explains about the existing evaluation methods specific to web and website finally summarizing best method suitable based on purpose of evaluation (Zahran, Al-Nuaim, Rutter, Benyon, 2014). Below is the list of well known evaluation methodologies of websites and web (Zahran, Al-Nuaim, Rutter, Benyon, 2014).

- Web evaluation methods (WEMs):
    - Web analytics tools which are Google analytics and Alexa
    - Link analysis methods such as PageRank and Webometrics methods.
- Website evaluation methods (WSEMs):
    - User based
    - Evaluator based
    - Automatic website evaluation tools as Bobby, LIFT, etc.

An un-moderated usability testing demand is in rise lately compared to conventional laboratory test (Liu, Bias,Lease, & Kuipers, 2012). The increase in the demand is mainly due to un-moderated usability test's low cost (evaluator observes the user action over a video recording), easy location setup (user's home) etc however this has a drastic effect on think-aloud protocol because verbalization of the user will not be accurate as the evaluator is remotely sitting (Liu, Bias,Lease, & Kuipers, 2012). During usability evaluation verbalization forms the core part of think-aloud protocol, the quality of the verbalization content gathered by the evaluator has many factors associated with it which are as below (Hertzum, 2016).

- Whether the user is remotely observed
- Usability evaluation is based on predefined task list or user has freedom to explore the website on his own,
- Quality of the verbalization which is relevant to user interface's usability criteria, evaluator's smartness to differentiate the user's verbalization to find the minutest details.

Usability evaluation are perfect for observing participant's behaviors and measuring website performance issues and collect data about participants opinion and view point about the website (Rubin & Chisnell, 2008; Rodriguez et al. 2012).

Though observing in usability evaluation acts as a treasure of information there are few issues in observing the users which is explained as below (Rubin & Chisnell, 2008).

- Observer should be patience in accordance of the user's behavior in testing the interface because each user may take their own time to finish the tasks and observer should not burden or force the user to complete the task as this may have negative impact on the evaluation results

- Observing users in "sit-by" sessions is more advantageous compared to remotely observing the users as remote observation have limited deep discussions between user and observer.
- Observer should quickly understand user's frustration and encourage them through the evaluation process
- User's become conscious about their behavior and may affect the user testing
- Observer should not get angry or laugh if the user commits any mistake while.

Observers should follow ethics so that they do not cause any issues to the evaluation process such as not to pass comments about the user, distracting users by either talking or making noise, not to become defensive in correcting the user's testing (Loranger, 2016). Participants conduct the evaluation in more relaxed and natural way when the observers are observing from remote room because if the observer is in the same more they become more conscious and are distracted (Geisen & Bergstrom, 2017)

However human computer interaction gives more emphasis to design of the user interface for improving the interaction between human performance and computers (Manzari & Trinidad-Christensen, 2006). The website design determines user satisfaction and user's willingness to return to the website repeatedly; hence developing a web interface to oblige the user and therefore satisfy the user needs is a demanding task (Agarwal & Venkatesh, 2002).

Methodology

Usability metrics

Below usability metrics were used for usability evaluation of Zomato website.

- Efficiency
  - Navigate to the selected restaurant of their choice
  - Accuracy of the breadcrumbs options available on every page for navigation
  - Total time taken to complete all the tasks and any error encountered during task evaluation
- Effectiveness
  - How quickly and easily can the participants book a table for a restaurant of their choice?
  - Can the participant order food online for a restaurant?
  - Can the participant access detect place before ordering food online for a restaurant?
- Learnability
  - Time taken to find the place and search box information
  - Count of assistance requests to help them in evaluation
  - How quickly does the participant relearn the tasks
  - No hassle to use the new options available to read restaurant reviews, photos etc.
  - Can the user read the reviews of the restaurants they want to visit?
  - Can the user view the food pictures of the restaurants they are interested in?
  - Can the users rely on the restaurant search and reviews provided?
  - Can the user search a location of their choice?
  - Can the user view restaurant name they are searching?

    - Can the user view the cuisine they want to select?
- User Satisfaction
    - Participants satisfaction with the overall website functionalities
    - How satisfied are the participants with the restaurant search information,
- Errors
    - Number of errors encountered during any task.
- Qualitative methods
    - Participants verbal commentary while performing the tasks as part of think aloud protocol
    - Pre-test questionnaire was provided to the participants

Task List

Below are the ten task list used for usability evaluation

- You are interested in knowing about a particular restaurant situated in a place. Please find the place of the restaurant you want to explore.
- Now that you have selected the place, please find the name of the food or the eating place you are curious about.
- View the eatery information displayed. Can you view the name you searched for?
- You are now interested to know more about a buffet or cafeteria or pizzeria for example "The New China Buffet". Please view the details of the place.
- Before you plan to visit this café or bistro you would like to know the feedback other visitors have written about this place. Is the information provided helpful?
- This one particular seafood place serves amazing seafood but before your visit you want to have a visual glimpse of the each menu item they serve. Can you view the visuals?
- Find if the food place allows reservations before visiting it.
- Go back to previous search results or click on the breadcrumbs with the place you selected
- Change the place to different name and select food delivery
- Select food finder and then detect button

Design method

Design method used is "Think Aloud" procedure in combination of researcher's observation of the three participants when performing the ten task list. Before the evaluation started the researcher explained and requested the participants to verbalize their emotions and opinions for each of the tasks they conducted while using the website. Additionally researcher observed the participants for facial expression, mouse movement, keyboard usage etc. Laptop was up and running with the Google chrome web browser open and Zomato home page presented for the participant by the researcher. As the participants have contributed their valuable time for this usability evaluation small reward of candies and refreshments was provided. As Zomato website is already existing web application which is currently in production any suggestion provided after the evaluation will be part of the website redesign or enhancement. Think-aloud method was used for this evaluation process because of its best qualities in collection of accurate data, no training required, live feedback is advantageous and participants are only three in number which allows the researcher to fully concentrate in interpreting the information.

The Think-aloud method is best and most treasured tool for usability evaluation methods (Nielsen, 2012). This method has immense scope in providing detailed data as the user verbally explains the tasks performed or any frustration being faced (Zahran, Al-Nuaim, Rutter, Benyon, 2014). However the best tool can sometimes make the user uncomfortable and misrepresent the information given by the user, it all depends on how comfortable the user is with think-aloud method (Nielsen, 1994)

The main purpose of the website usability evaluation should be intensely researched, analyzed and determined even before planning to start the evaluation process, the following bullet points gives an overview of the purpose of the evaluation and type of evaluation method to adapt to the purpose (Zahran, Al-Nuaim, Rutter, Benyon, 2014).

- Website redesign: Website evaluation methods such as user testing, heuristic evaluation, tool based evaluation and web evaluation method such as Google analytic tool. R shiny application called ABCMETAapp can be used for estimating usability evaluation (Kwon et al., 2021)
- Web traffic/ Web ranking: Web evaluation methods and web analytics tools relevant to this evaluation purpose.
- Popularity/ Importance: Web evaluation methods and link analytics tools such as PageRank.
- Connectivity/ Visibility: Web evaluation methods and link analytics tools such as Webometrics.

Test Procedure

Below flow chart explains usability evaluation test process.

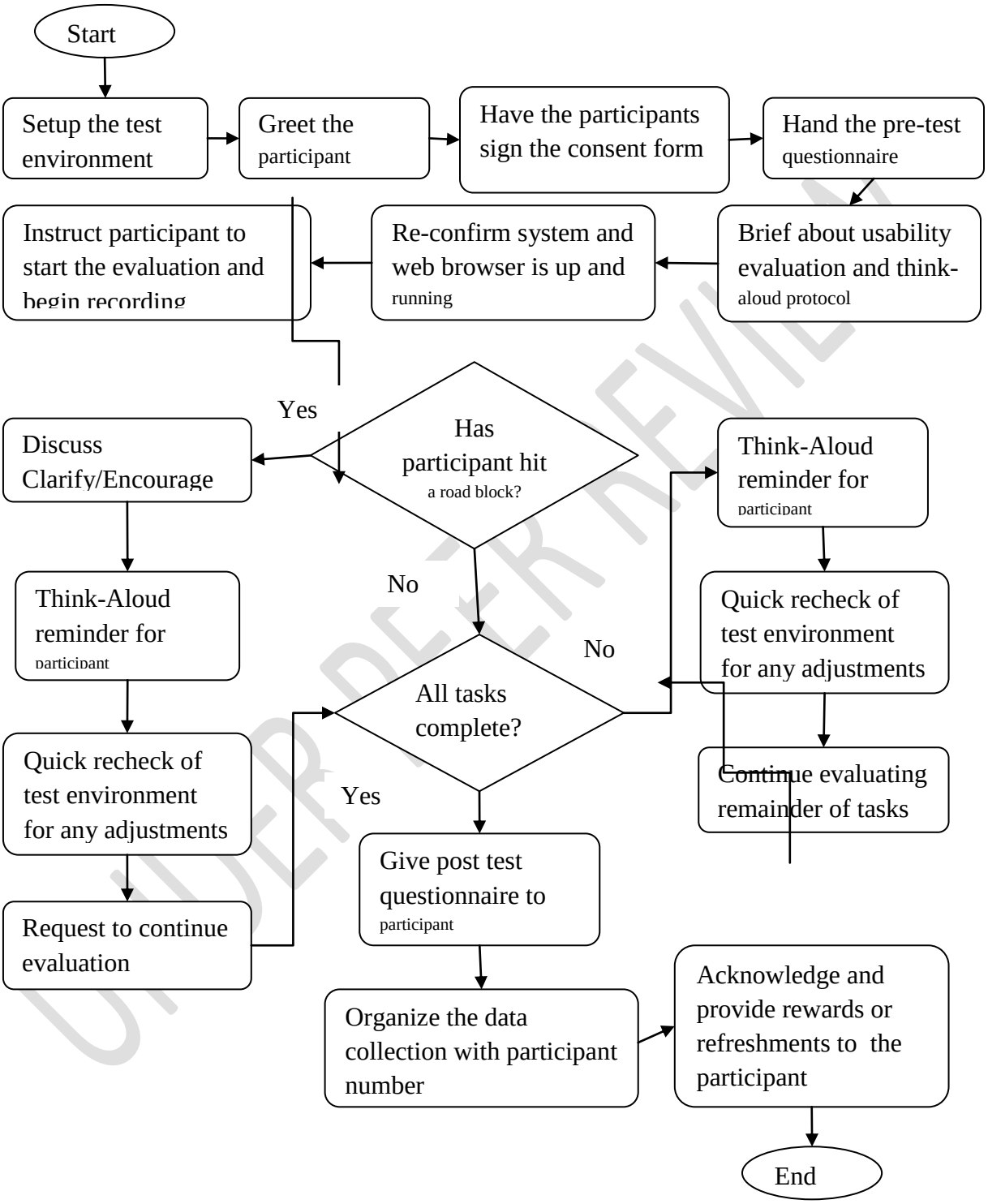

Figure 1 Test Procedure Flow Chart

Results

Participant summaries

Summation of Test Results for Participant #1: The first participant is female aged fifty five and highest level of education is high school. Last year started EOSL program in local community college to improve spoken English. Mainly uses computer and internet to practice English, search new recipes in Google and send email to family. Facial expression during entire evaluation was happy energetic at the beginning, curious while performing tasks and enthusiastic. When performing tasks like typing in restaurant or location information participant was searching for few keys on the keyboard before typing. All the tasks were completed within the time limit. Tasks 1 to 9 were completed without any issues. Task 10 could not be performed because did not receive proper feedback from website for the action performed. Minimal help asked from researcher. Participant's verbal comments as below

Task 1 to 4:

"I am so happy to find my hometown on this list"
"Can I type Italian or Japanese or Chinese?"
"Wow! I can search for so many cuisines"
"I never knew that my hometown has so many restaurants currently. This is just amazing"

Task 5 to 9:

"So many details for just one restaurant interesting!" with rolling eyes
"When was this website launched? How I wish I knew it before I spent my money on unnecessary restaurants"
"Super cool reviews"
"The food pictures are tempting I am feeling hungry now"
"All the restaurants I visited has book a table option, I am going to use option from today"

Task 10:

"Should not this option show my current location as Miami?"
At the end of task ten, participant mentioned one wish "I hope this website provided food recipe information from these restaurants".

Summation of Test Results for Participant #2: The second participant is male aged seventy three and highest level of education is bachelor of civil engineering. Started using computer and internet since one year. Facial expression during entire evaluation was initially tensed but later felt comfortable. When performing tasks like typing in restaurant or location information participant was searching for every key on the keyboard that was been typed. Moving mouse pointer many times before performing any task. All the tasks were completed within the time limit. This participant had a unique way of searching for locations and restaurant for example searching for legacy restaurants which were hundred years old or searching a village name for location. Participant was not happy with the search results. Task 10 could not be performed because did not receive proper feedback from website for the action performed. Minimal help asked from researcher. Participant's verbal comments as below

Task 1 to 4:

"I am typing my village name. I am curious to know if this website has my village name listed"
"Sad! Cannot find my village which has a very famous temple and a restaurant"
"Let me try a different location name as city"

"I have typed my favorite restaurant which is five minute walk from my home it is serving delicious food from past hundred years"
"Interesting it does not list this restaurant!!!"
"Let me try a new restaurant I visited yesterday"
"Nice! Do you know why old restaurants were not listed in this website?"
Task 5 to 9:
"Very good work by the reviewers, very detailed information provided"
"Why is a picture of a man sitting in a restaurant posted? Isn't there supposed to be food related photos?"
Task 10:
"Why is my current location as Miami not shown?"
Summation of Test Results for Participant #3: The third participant is male aged thirty four and highest level of education is PhD in Statistics. Works on computer for eight hours and remaining hours for browsing internet or playing games. An avid foodie visits any new restaurant recently opened. Facial expression during entire evaluation was calm and composed. Typing was pretty fast and did not look at keyboard even once. All the tasks were completed within the time limit. The participant was very smart in detecting that for one country book a table was displayed, for another country it was not displayed as part of task 8. Very fast in performing all the tasks without any help, tried few more tasks such as filter option etc. out of curiosity. Task 10 could not be performed because did not receive proper feedback from website for the action performed. Minimal help asked from researcher. Participant's verbal comments as below
Task 1 to 4:
"Am I allowed to search for only one location or restaurant?"
"I will try combination of restaurants which are really old, new etc."
"I am trying the new restaurant I just visited yesterday"
"Cannot find the restaurant name in search results"
"No worries let me try few more restaurant names"
"Nice! Good work by Zomato for providing so many options and details of the restaurant"
"This app is simple to use with clear filter options"
Task 5 to 9:
"How come book a table button vanished for this particular location?"
"Way too many repetitive photos of same food but posted by many individuals"
"Aren't the bread crumbs supposed to take back to me previous results page?"
Task 10:
"I was expecting the current location as Miami to be detected?"
Summation of Test Results for Participants #1, #2, and #3: Overall all the participants co-operated very well in successfully complete the usability evaluation. Participant 1 and participant 3 completed all ten tasks in eighteen minutes. Participant 3 completed the tasks in twenty six minutes. Task 10 was not completed by all three participants. For task 8 participant 1 and 2 did not notice the bread crumbs available instead just used the back button available to navigate back to previous page. Only participant 3 observed the breadcrumbs and noticed that the navigation is not up to the mark. Related to task 8 only participant 3 was able to find the issue with book table

option not available for few countries where as participant 1 and 2 did not find this problem as they were using only one country.

Qualitative results

Table below portrays the details of the information gathered from pre-test questionnaire

Questions	Participant 1	Participant 2	Participant 3
Gender	Female	Male	Male
Age	55	73	34
Education	High School	Undergraduate	PhD
How comfortable are you working on a laptop?	Medium	Medium	High
About how many hours a week do you use a computer?	14	7	50
How many hours a week do you spend searching the Internet?	7	3	20
Name few common topics you search on internet?	Spoken English, Food recipes	News	News, Cricket, Blogs, Restaurants
Are you comfortable using Google chrome web browser?	Yes	Yes	Yes
Have you used the Zomato website before?	No	No	No
Do you use any restaurants search websites? If yes, Please mention the names?	No	No	Yelp, Google eats

Table 1 Pre-test questionnaire details

Quantitative results

Table gives information about participant's task completion success rate.

Task	Participant 1	Participant 2	Participant 3	Success Rate
1	√	√	√	**100%**
2	√	√	√	**100%**
3	√	√	√	**100%**
4	√	√	√	**100%**
5	√	√	√	**100%**
6	√	√	√	**100%**
7	√	√	√	**100%**

8	√	√	√	**100%**
9	√	√	√	**100%**
10	-	-	-	**0%**

Table 2 Each task completion success rate

Below table gives information about time completion for each task in minutes by each participants and average time for each task. For example 5 = 5 minutes. Total average time is 20.5 minutes and the mean value is 2.27 minutes. Standard deviation (Kwon et al, 2021) is 0.75. Participant 1 and 3 completed all the tasks in 18 minutes and participant 3 completed in 26 minutes

	Participant 1	**Participant 2**	**Participant 3**	**Total Average Time**
Task 1	1	1	1	1
Task 2	3	4	2	3
Task 3	2	5	2	3
Task 4	3	2	3	2.6
Task 5	2	5	2	3
Task 6	2	3	1	2
Task 7	1	1	4	2
Task 8	1	1	2	1.3
Task 9	3	4	1	2.6
Task 10	-	-	-	-
Total Time	18	26	18	20.5
			Mean(Average)	**2.27**
			Standard Deviation	**0.75**

Table 3 Time completion rates for each task

The error rates for each tasks is displayed in below table. It is clear that only total of two errors were performed by participant 1 and participant 2. The minor error was in place of typing restaurant name participants typed location name and typed restaurant name in location search box.

Tasks	**Participant 1**	**Participant 2**	**Participant 3**	**Total Errors**
1 – Search a location of your choice and select it.	1	1	0	2

2 – Search a restaurant or cuisine of your choice relevant to the location you have selected.	1	1	0	2
3 – View the restaurant search	0	0	0	0
4 – Click on any restaurant name to view the details	0	0	0	0
5 – Read the reviews of the restaurant	0	0	0	0
6 – View the photos of the restaurant	0	0	0	0
7 – Find the book table for the restaurant	0	0	0	0
8 – Go back to previous search results or click on the breadcrumbs with the location you selected	0	0	0	0
9 – Change the location to different country and click online delivery	0	0	0	0
10 – Click on Find food and detect button	0	0	0	0

Table 4 Error Rates for each task performed

Below table displays the total participant's agreement, disagreement and neutral opinions about the Zomato website as gathered from post-test questionnaire answers. For example if all participants strongly agreed then number 3 is displayed in strongly agreed column, if only one participant strongly agreed then 1 is displayed and so on. Percent agree is based on total number of people who both agreed and strongly agreed for a question for example if all three agreed and strong agreed then it is 100%.

Questions asked	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Percent Agree
Website was easy to use					3	100%
Definitely use this website for restaurant search		1	1		1	33%
Able to find restaurant names and locations			2		1	33%
Satisfied with Restaurant search results			2		1	33%
Restaurant reviews were					3	100%

informative						
Restaurant photos were relevant	1				2	66%
Able to view book table for the restaurants			1		2	66%
Detect location option was very useful	3					0%
Quickly find the place and search box option					3	100%

Table 5 Post-Test Questionnaire details

Usability Problems Summary

Below is the severity levels used

Severity Level	Description
1	The problem prevents performance or completion of task
2	The problem creates significant delay and/or frustration for the user.
3	The problem creates some frustration for the user.
4	The problem does not significantly affect usability.
5	Enhancement issues

Table 6 Severity Levels with description

Frequency Ranking	Description
1	Occurs < 10%
2	Occurs 11-50%
3	Occurs 51-89%
4	Occurs > 90%

Table 7 Frequency ranking with description

Problem # 1: The detect location button does not function (related to task 10)

- Scope: Global
- Severity level: 1
- Frequency: 4 (Every time the button is clicked this issue occurs)
- Explanation: The detect location button does not auto detect the location and there is no message or feedback displayed if there was any error.

- Recommendations: Display appropriate message when clicked or detect the location currently

Problem # 2: The bread crumbs links does not behave as expected (related to task 8)

- Scope: Global
- Severity level: 5
- Frequency: 4 (Every time the links of bread crumbs are clicked)
- Explanation: If the participant is on any particular page for example restaurant review page when click on any bread crumb link as displayed it does not take to the page as per the name displayed on the bread crumb link.
- Recommendations: Better remove this option as it is not used by majority of the participants.

Problem # 3: Few restaurant photos have irrelevant photos displayed (related to task 6)

- Scope: Global
- Severity level: 4
- Frequency: 1 (Participant found it for only one restaurant.)
- Explanation: Few restaurant photos have irrelevant photos instead of food for example picture of a person sitting on the restaurant chair
- Recommendations: The Zomato team should follow strict rules to not allow users to post pictures irrelevant to food or restaurant.

Problem # 4: Book table option is not consistent (related to task 8)

- Scope: Global
- Severity level: 4
- Frequency: 1 (Participant found this issue with only one country).
- Explanation: Book table option is not consistent for the countries for example restaurants in country such as India had an option to book a table whereas for USA this option was not displayed
- Recommendations: Display appropriate message saying why book a table option is not available to this country.

Discussion

All the participants (100%) agreed that the website was easy to use. However only few (33%) agreed to use the website for restaurant search in future. With respect to restaurant and location search based on the choice of the participant only 33% were satisfied to find the names and locations. Remaining 66% were neutral in their agreement because these participants were not able to find the restaurant which was hundred years old or a restaurant which was recently opened but were able to find other restaurants which were neither too new nor legacy. Similarly only handful (33%) agreed with restaurant search result satisfaction. In contrast majority (100%) agreed for the informative restaurant reviews provided for the restaurant which were selected. Only more than half (66%) agree for relevant photos displayed where remaining participants (33%) strongly disagreed because photo unrelated to food was displayed. Most of the participants (100%) were able to quickly find the place and search box option. Only few participants (33%) experienced inconsistent results in finding book a table for few locations whereas rest (66%) did not experience any issues. Detect location option in the website showed disaster results (0%) where none of the participants found it useful.

These results show that although the website is easy to use there are weak areas such as restaurant search results, location name listing, and restaurant listing which did not satisfy few participants completely. All the tasks were completed by all participants within total average of 20.5 minutes which is good sign for good website navigation. Detect location option available was the only task which failed. Over all only two errors were made by participants by either typing location name in search box or search name in location box. The errors made by participants are not major errors.

Recommendations

Based on the results it is highly recommended that the detect location button should be fixed to find the current location. Related to this detect location button displaying information indicating what is the error or processing information should be displayed as well. There are high chances for users visiting the website to search for legacy restaurants or new restaurants. Hence a providing legacy and brand new restaurant details will be an added bonus to Zomato. New filter options to search for restaurant based on number of years or year started is helpful. As the bread crumbs links is not serving any purpose best solution is to remove these navigation links because majority of the users will not use these links, it any one uses it leads to confusion or frustration.

List of recommendations is as below

- Display appropriate message when clicked and detect the location currently.
- Display appropriate message saying why book a table option is not available to this country.
- Better remove this option as it is not used by majority of the participants.
- Provide brand new and legacy restaurant information in the website.
- Remove bread crumbs links to stop confusion and frustration.

Conclusion

Usability evaluation for Zomato website helped in learning a lot of information about how each participant varies when interacting with a website although everyone's common interest is finding restaurants which serve delicious food. Very surprising factor was that website provides various locations and restaurant search yet there were few participants were unable to find few locations. Never expected that participants will search for remote villages and legacy restaurants, this is great find for Zomato website to update their locations list. Zomato should not stick to "one size fits all" concept by providing only limited restaurant information, because there are many food enthusiasts who have different tastes, locations, cuisines, their preferences etc. Participant's response for using the website for future restaurant search was unexpected because everyone did not agree to use the website for future use. This implies that website's ease of use, effectives, learnability etc is not sufficient to attract customers to use the website instead more emphasis should be on user satisfaction in providing more content relevant to customer's needs. One of new emerging design issues is content management which should be given the majority importance by the website designers in near future (Downing & Liu 2011). Zomato website should add more restaurants specific to the location and keep updating every new restaurant launched in the market. As this usability evaluation was conducted with three participants a repeated evaluation of this website will use more than ten participants, automation

tool for web usage analytics, the test environment will be more elaborate with cameras setup and most importantly heuristic evaluation methodology will be used additionally to capture accurate results of usability evaluation.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

Appendix

Pre-Test Questionnaire Form

(Please print or write clearly)

Name: _____

Gender: Male Female

Age:

Education: High School Undergraduate Graduate Ph.D.

How comfortable are you working on a laptop?

About how many hours a week do you use a computer?

How many hours a week do you spend searching the Internet?

Are you comfortable using Google chrome web browser? Yes No

Have you used the Zomato website before? Yes No

Do you use any restaurants search websites? If yes, Please mention the names?

Post Test Questionnaire Form

Name: _____

Please select appropriately based on your usability evaluation experience. Feel free to add comments.

1. I feel the website was easy to use.

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

2. I will definitely use this website for restaurant search.

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

3. I was able to find restaurant names and location names of my choice.

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

4. I am satisfied with Restaurant search results.

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

5. I found the restaurant reviews very informative.

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

6. I feel restaurant photos were relevant.

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

7. I was able to view book table for the restaurants I chose.

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

8. The detect location option was very useful

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

9. I was able to quickly find the place and search box option

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

Screen Captures

Below screen displays the home page of the Zomato website

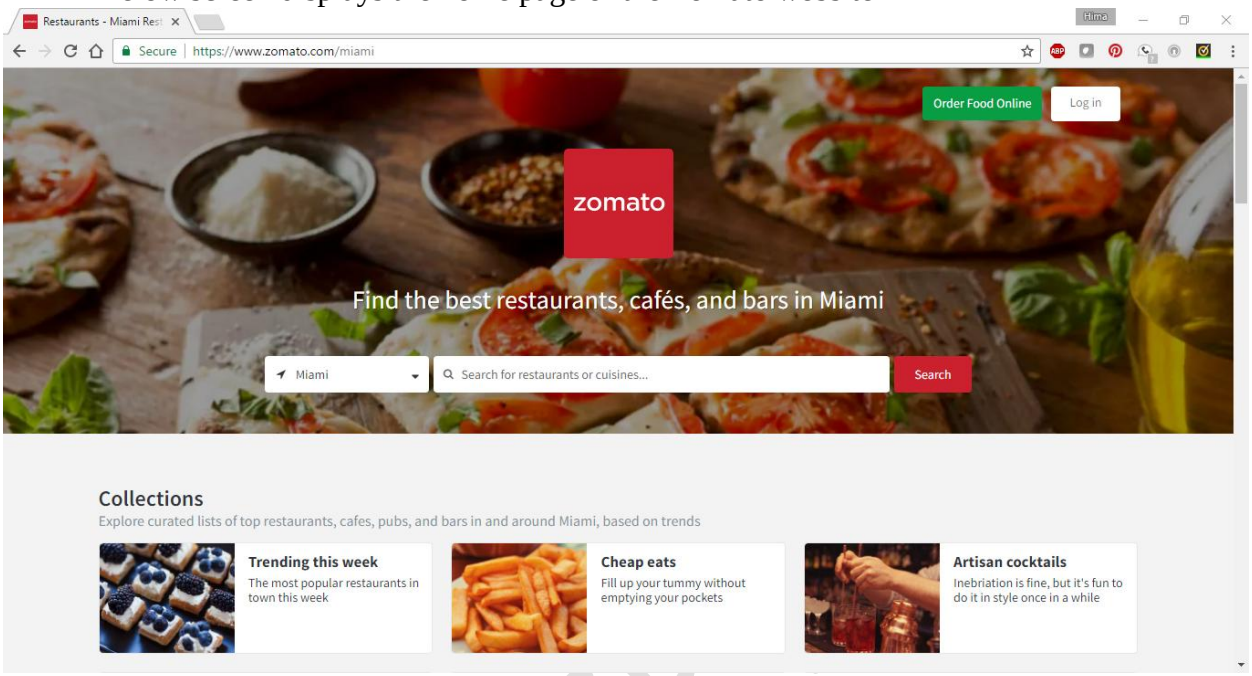

Figure 5 Zomato Home Page

The screen displayed below clearly shows book a table option in blue button on the right side of the screen for location “Bangalore”.

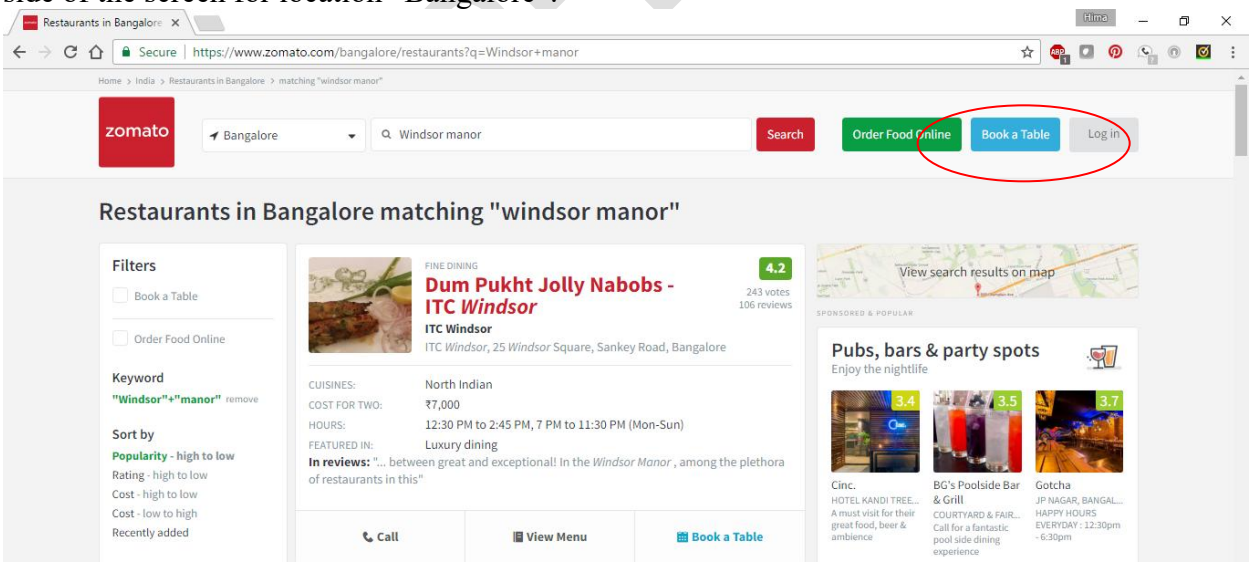

Figure 6 Book Table button displayed for location Bangalore

Related to the book and table functionality of the above screen, it can be seen that book a table option on the right side of the screen is missing for location “Miami”.

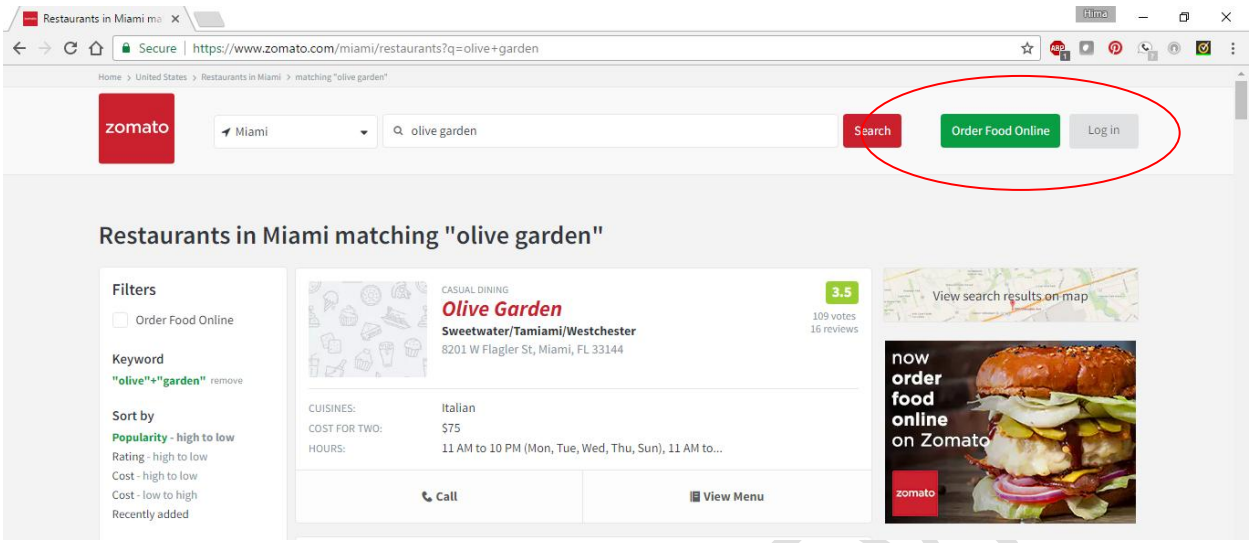

Figure 7 Book Table button not displayed for location Miami

The bread crumbs highlighted in yellow in below screen shows “Bangalore Restaurants” and is not consistent when navigated to next page from this page.

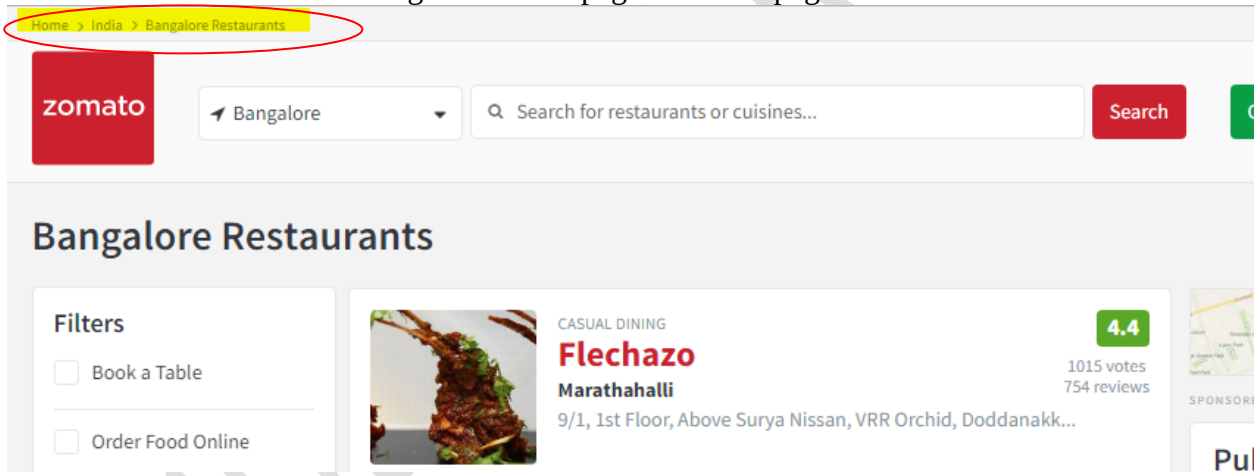

Figure 8 Bread crumbs displayed as name Bangalore Restaurants

When the page navigates to next page ”Bangalore Restaurants” changes to “Bangalore”.

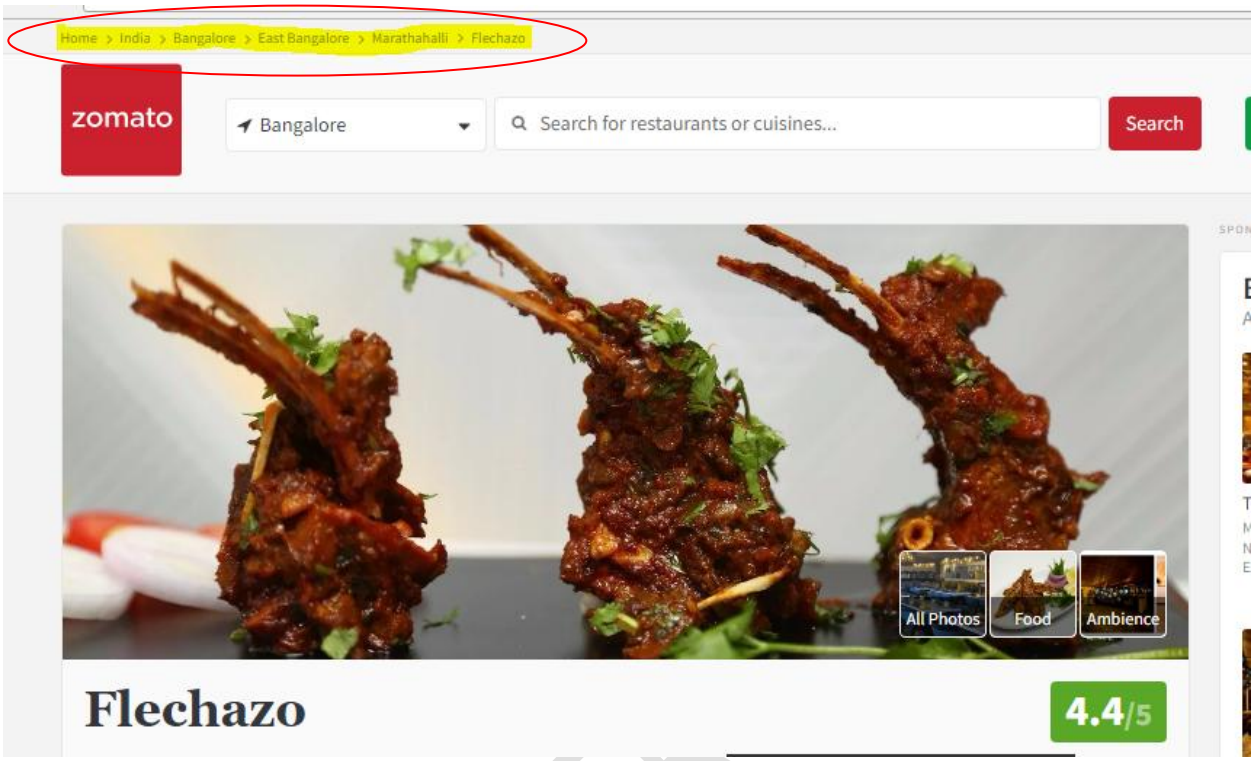

Figure 9 Bread crumb name Bangalore Restaurants changes to Bangalore

References

Abran, A., Khelifi, A., Suryn, W., & Seffah, A. (2003). Usability meanings and interpretations in ISO standards. Software Quality Journal, 11(4), 325-338.

Agarwal, R., & Venkatesh, V. (2002). Assessing a Firm's Web Presence: A Heuristic Evaluation Procedure for the Measurement of Usability. Information Systems Research, 13(2), 168-186.

Alroobaea, R., & Mayhew, P. J. (2014, August). How many participants are really enough for usability studies?. In Science and Information Conference (SAI), 2014 (pp. 48-56). IEEE.

Atterer, R., Wnuk, M., & Schmidt, A. (2006, May). Knowing the user's every move: user activity tracking for website usability evaluation and implicit interaction. In Proceedings of the 15th international conference on World Wide Web (pp. 203-212). ACM.

Aziz, N. S., Kamaludin, A., & Sulaiman, N. (2013). Assessing web site usability measurement. IJRET: International Journal of Research in Engineering and Technology, 2(09), 386-392.

Benbunan-Fich, R. (2001). Using protocol analysis to evaluate the usability of a commercial web site. Information & management, 39(2), 151-163.

Chiew, T. K., & Salim, S. S. (2003). Webuse: Website usability evaluation tool. Malaysian Journal of Computer Science, 16(1), 47-57.

Downing, C. E., & Liu, C. (2011, July). Assessing web site usability in retail electronic commerce. In Computer Software and Applications Conference (COMPSAC), 2011 IEEE 35th Annual (pp. 144-151). IEEE.

Flavián, C., Guinalíu, M., & Gurrea, R. (2006). The role played by perceived usability, satisfaction and consumer trust on website loyalty. Information & Management, 43(1), 1-14.

Geisen, E., & Bergstrom, J. R. (2017). Usability Testing for Survey Research. Morgan Kaufmann.

Goodwin, N. C. (1987). Functionality and usability. Communications of the ACM, 30(3), 229-233.

Hallahan, K. (2001). Improving public relations web sites through usability research. Public Relations Review, 27(2), 223-239.

Hertzum, M. (2016). A usability test is not an interview. interactions, 23(2), 82-84.

Insfran, E., & Fernandez, A. (2008, September). A systematic review of usability evaluation in web development. In International Conference on Web Information Systems Engineering (pp. 81-91). Springer Berlin Heidelberg.

Krug, S. (2014). Don’t make me think revisited. A common sense approach to web and mobile usability. Berkeley, CA: New Riders.

Kwon, D., Reddy, R. R. S., & Reis, I. M. (2021). ABCMETAapp: R shiny application for simulation-based estimation of mean and standard deviation for meta-analysis via approximate Bayesian computation. *Research synthesis methods*, *12*(6), 842-848.

Lallemand, C. (2011, June). Toward a closer integration of usability in software development: a study of usability inputs in a model-driven engineering process. In Proceedings of the 3rd ACM SIGCHI symposium on Engineering interactive computing systems (pp. 299-302). ACM.

Liu, D., Bias, R. G., Lease, M., & Kuipers, R. (2012). Crowdsourcing for usability testing. Proceedings of the American Society for Information Science and Technology, 49(1), 1-10.

Loranger, H. (2016, March 29). Write Better Qualitative Usability Tasks: Top 10 Mistakes to Avoid. Retrieved from https://www.nngroup.com/articles/better-usability-tasks/

Manzari, L., & Trinidad-Christensen, J. (2006). User-centered design of a web site for library and information science students: Heuristic evaluation and usability testing. Information technology and libraries, 25(3), 163.

Matera, M., Rizzo, F., & Carughi, G. (2006). Web usability: Principles and evaluation methods. Web engineering, 143-180.

Nielsen, J. (1994). Usability engineering. Elsevier.

Nielsen, J. (2000). Designing web usability: The practice of simplicity. New Riders Publishing.

Nielsen, J. (2012). Thinking aloud: The# 1 usability tool. Nielsen Norman Group. Retrieved from https://www.nngroup.com/articles/thinking-aloud-the-1-usability-tool/.

Nielsen, J., & Molich, R. (1990, March). Heuristic evaluation of user interfaces. In Proceedings of the SIGCHI conference on Human factors in computing systems (pp. 249-256). ACM.

Preece, J. H., Sharp, H., & Rogers, Y. (2015). Interaction Design. Beyond Human-Computer Interaction. 4th Edition. Somerset, NJ: John Wiley & Sons.

Redish, J. (2010). Technical communication and usability: Intertwined strands and mutual influences. IEEE Transactions on Professional Communication, 53(3), 191-201.

Redish, J. G., Bias, R. G., Bailey, R., Molich, R., Dumas, J., & Spool, J. M. (2002, April). Usability in practice: formative usability evaluations-evolution and revolution. In CHI'02 extended abstracts on Human factors in computing systems (pp. 885-890). ACM.

Rodriguez, K. M., Reddy, R. S., Barreiros, A. Q., & Zehtab, M. (2012, June). Optimizing program operations: Creating a web-based application to assign and monitor patient outcomes, educator productivity and service reimbursement. In *DIABETES* (Vol. 61, pp. A631-A631). 1701 N BEAUREGARD ST, ALEXANDRIA, VA 22311-1717 USA: AMER DIABETES ASSOC.

Rubin, J., & Chisnell, D. (2008). Handbook of usability testing. Second Edition. New York: Wiley.

Schade, A. (Schade, April 9). Write Better Qualitative Usability Tasks: Top 10 Mistakes to Avoid. Nielsen Norman Group.Retrieved from https://www.nngroup.com/articles/better-usability-tasks/

Seffah, A., & Metzker, E. (2004). The obstacles and myths of usability and software engineering. Communications of the ACM, 47(12), 71-76.

Sullivan, B. (2000). Designing Web Usability: The Practice of Simplicity. Technical Communication, 47(3), 411-411.

Tullis, T., Albert, W., Dumas, J. S., & Loring, B. A. (2008). Measuring the User Experience: Collecting Analyzing, and Presenting Usability.

Whitehead, C. C. (2006, March). Evaluating web page and web site usability. In Proceedings of the 44th annual Southeast regional conference (pp. 788-789). ACM.

Zahran, D. I., Al-Nuaim, H. A., Rutter, M. J., & Benyon, D. (2014). A comparative approach to web evaluation and website evaluation methods. International Journal of Public Information Systems, 10(1).