

Heuristic Evaluation of Usability for Web Application

Case Study: <http://www.yatra.com/>

Team Members

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Introduction

The International Organization for Standardization (ISO) defines Usability of a product as “the extent to which the product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use.” Usability has five attributes: learnability, efficiency, memorability, errors, and user satisfaction. The criticality of these attributes depends on the type of application.^[1]

Usability engineering is the discipline that provides structured methods for achieving usability in user interface design during product development. Usability evaluation is part of this process, which inspects whether the application adheres to the established usability principles. There are various usability evaluation techniques available. In this document we will focus on one of the widely used technique called heuristic evaluation technique.

The document is organized with the introduction to heuristic evaluation technique and case study of travel booking web application that is taken for evaluation. The results of the evaluation are discussed at the end.

Heuristic Evaluation^[2]

Heuristic evaluation is a usability engineering method for finding the usability problems in a user interface design so that they can be attended to as part of an iterative design process. Heuristic evaluation involves having a small set of evaluators examine the interface and judge its compliance with recognized usability principles (the "heuristics").

Heuristic evaluation is performed by having each individual evaluator inspect the interface alone. Only after all evaluations have been completed are the evaluators allowed to communicate and have their findings aggregated. This procedure is important in order to ensure independent and unbiased evaluations from each evaluator. The results of the evaluation can be recorded either as written reports from each evaluator or by having the evaluators verbalize their comments to an observer as they go through the interface.

Heuristic reviews are less expensive and less time-consuming to conduct than user-centered evaluations. The cognitive walkthrough can be accomplished using only a text description of the user interface and therefore can be used very early in the software development process.

Case Study : [yatra.com](http://www.yatra.com)

yatra.com is a web application provides services for online travel booking. It act as a single point booking for various travel service. User can book hotel accommodation and leverage various offers provided by the travel services. It also provides various information for the travel, city guide and with several travel packages.

We will evaluate the usability of yatra.com website using the heuristic technique. There are three evaluators in total evaluating the site. The evaluators are 'regular' usability specialist with user interface design and evaluation knowledge.

Let see the steps involved in performing the heuristic evaluation of the site:

1. The heuristics are set to evaluate the user interface. The problems are identified which are violating the heuristics. (See the Appendix for the Applicable Heuristics.)
2. Each evaluator use the heuristics and his/her experience and knowledge to identify the problems.
3. The problems are classified with severity level (See the Appendix for the Severity categories).
4. Each problem is associated with the severity, applied heuristic and the problem element.
5. Finally the problems identified by the individual evaluators are merged and compiled into a single evaluation with the details of the proportion.

Results of the Heuristic Evaluation

The results of the heuristic evaluation of the website yatra.com is consolidated according to the severity of the problems. The each problem found is rated (in percentage) according the proportions of the evaluators. (See the Appendix for the individual evaluator results.)

The Usability problems found are categorized based on the evaluator findings. The problems are rated against with the number of evaluator indentified.

<i>Problems</i>	<i>Evaluators (proportion)</i>
<i>Usability Problems with High Severity</i>	
Calendar control hidden behind the advertisement region	33%
User not able to sort the search results for package offers	33%
There is no tool tip help for the buttons and links	33%
User is not warned while switching to other link in the middle of registration	33%
There is no context sensitive help (eg: how to book for a trip)	66%
Color-blind people may have problems finding clickable elements, since the clickability is color coded	33%
No distinction is done between content, structure and presentation of the pages, making usage of accessibility tools very difficult	33%
The interface doesn't behave correctly under a gecko based browser: can't go further after selecting the trip	33%
Usage of the name : FAQs to refer to help	33%
Makes use of Flash animations which defeat screen readers	33%
Booking of car and flights takes long time	33%
<i>Usability Problems with Medium Severity</i>	
Response time of searching takes long time	66%

<i>Problems</i>	<i>Evaluators (proportion)</i>
Date validation is not done properly. Allows users to enter invalid date	33%
Calendar control does not disappear after selecting other option	33%
Animated advertisement next to travel selection is distracting	66%
The FAQ does not provide any visual aid (for booking and for other answers)	66%
There is no options for the user to search for a particular flight/travel service	33%
Pages are more graphics intensive taking more loading time	33%
Site is not designed for the access of people with disabilities	66%
There is no personalized information of the user	33%
No information related to the offers provided by the travel services	66%
The color change of the visited links are not changed always. Use of non-standard links i.e. links are sometimes not underlined	100%
Field focus is not proper. (Set the keyboard focus to the first field when the registration form is displayed.)	33%
Field selection need to be better. Instead of typing name of state & country, provide drop-down to easily select the user's information. If it is not included in the list then provide separate box for typing	33%
Dynamic client side validation is not present. For eg. after entering first name of user, the system displays error message if they type small letter. If user type capital letter then it allows sometimes.	33%
System can provide lowest fares in terms of graph with respect to departure date.	33%
Provide detailed traveling information from one place to other place within same state.	33%
If user miss any of the field in booking the car for pick up from airport, then it displays error message that could not understood by user.	33%
Provide flights information in terms of table with respect to time and flight no	33%
Forecasting the user needs are not present. For eg. instead of displaying information not found for some particular date if user searches flights/car/bus for booking, provide valid date that can offer before/after their desired date.	33%
The main page contains a lot of non necessary links	33%
Position of the page can be displayed differently for different platforms.	66%
Home and Flight buttons are redundant and may create confusion among	66%

<i>Problems</i>	<i>Evaluators (proportion)</i>
users	
The User registration form contains unnecessary inputs	33%
Pages when printed are being cut-off because of the use of fixed width design	33%
Usage of white text on cyan background makes text very difficult to read, the contrast is low in such cases	33%
<i>Usability Problems with Low Severity</i>	
Page is aligned to left, right portion is blank. Better to be in center.	33%
Feature of optimal travel path can be provided	66%
Sign-in and user registration page are same. Creates confusion.	33%
Advertisements are shown while performing the transactions. Creates distraction.	33%
The website provide a single style sheet for screen output, printing a page result in ink wastage	33%
The partners scrolling list is useless and disturbing	33%
Provide international travel package offers and hotel information	33%

Table 1: The proportion of evaluators who found each of the usability problems categorized according to the severity

The proportion of the usability problems found according to the severity, applicable heuristics and problem element are:

<i>Category</i>	<i>Proportion (in percentage)</i>
Severity	
High	26%
Medium	58%
Low	16%
Applicable Heuristic	
Provide user interested information	2%
Provide quick navigation	17%
Provide meaningful name, graphics and layout	11%
Provide meaningful search results	2%
Provide context sensitive help	7%

<i>Category</i>	<i>Proportion (in percentage)</i>
Provide appropriate error message	4%
Provide good response time	7%
Provide a platform independent support	5%
Provide proper Accessibility	24%
Provide accessible for users with disabilities	7%
Adherence to the standards	0%
Provide additional options for better usability	10%
Perform client side validation	2%
Provide easy of use and learning	2%
Problem Element	
Home page	22%
Travel selection	29%
Travel Package offers	15%
Help and Information	16%
Login and Registration	16%
Search	12%
FAQ	13%
Others	12%

Table 2: The Proportion of various types of usability problems found

Conclusion

After evaluating the website yatra.com for usability using the heuristic evaluation technique, it is found that the overall use interface of the website is good. The website provides appropriate user interface and information for the user in a better manner. But there few major and lot of minor issues are found during the evaluation. Most the issues are related to the user accessibility and the navigation of the site. And most of the problems are found in the home page and the travel selection element.

References

- [1] Jean Scholtz, "Usability Evaluation", National Institute of Standards and Technology.
- [2] Jakob Nielsen, "Finding usability problems through heuristic evaluation", in proceedings of the SIGCHI conference on Human factors in computing systems, pages: 373 - 380,1992.

APPENDIX

Severity:

Severity is classified as *High*, *Medium* and *Low*. The *high* is classified if the issue really hinders the product usability and causing confusion to the user in using the products. The *medium* is classified if the issue creates annoyance in the usability of the products. The *low* is classified for the color, alignments, layouts and other minor issues.

Applied Heuristics:

1. Provide user interested information
2. Provide quick navigation
3. Provide meaningful name, graphics and layout
4. Provide meaningful search results
5. Provide context sensitive help
6. Provide appropriate error message
7. Provide good response time
8. Provide a platform independent support
9. Provide proper Accessibility
10. Provide accessible for users with disabilities
11. Adherence to the standards
12. Provide additional options for better usability
13. Perform client side validation
14. Provide easy of use and learning

Problem Element:

1. Home page
2. Travel selection
3. Travel Package offers
4. Help and Information
5. Login and Registration
6. Search
7. FAQ

Evaluator: Prathab K

<i>Problem</i>	<i>Severity</i>	<i>Applied heuristics</i>	<i>Problem element</i>
Response time of searching takes long time	Medium	7	2
Calendar control hidden behind the advertisement region	High	2	2
Date validation is not done properly. Allows users to enter invalid date	Medium	13	2
Page is aligned to left, right portion is blank	Low	3	1
Calendar control does not disappear after selecting other option	Medium	2	2
User not able to sort the search results for package offers	High	4	6
Animated advertisement next to travel selection is distracting	Medium	3	2,3
There is no tool tip help for the buttons and links	High	2	All
User is not warned while switching to other link in the middle of registration	High	6	2
There is no context sensitive help on how to book for a trip	High	5	All
The FAQ does not provide any visual aid (for booking and for other answers)	Medium	5	7
There is no options for the user to search for a particular flight/travel service	Medium	12	2
Pages are more graphics intensive taking more loading time	Medium	7	1
Site is not designed for the access of people with disabilities	Medium	10	All
There is no personalized information of the user	Medium	9	1
No information related to the offers provided by the travel services	Medium	1	1
The color change of the visited links are not changed always	Medium	2	All
Feature of optimal travel path can be provided	Low	12	2
Sign-in and user registration page are same	Low	9	5
Links referring to the current page are not invalidated (eg: registration page-sign in link)	Low	9	5
Advertisements are shown while performing the transactions	Low	9	2

Evaluator: Radha A

<i>Problem</i>	<i>Severity</i>	<i>Applied heuristics</i>	<i>Problem element</i>
Field focus is not proper. (Set the keyboard focus to the first field when the registration form is displayed.)	Medium	9	4
Field selection need to be better. Instead of typing name of state & country, provide drop-down to easily select the user's information. If it is not included in the list then provide separate box for typing	Medium	9	4
Dynamic client side validation is not present. For eg. after entering first name of user, the system displays error message if they type small letter. If user type capital letter then it allows sometimes.	Medium	9	4
System can provide lowest fares in terms of graph with respect to departure date.	Medium	12	2 & 3
Provide international travel package offers and hotel information	Low	12	3
Provide detailed traveling information from one place to other place within same state.	Medium	12	5
If user miss any of the field in booking the car for pick up from airport, then it displays error message that could not understood by user.	Medium	6	2
Booking of car and flights takes long time.	Major	7	2
Provide flights information in terms of table with respect to time and flight no	Medium	3	2 & 3
Forecasting the user needs are not present. For eg. instead of displaying information not found for some particular date if user searches flights/car/bus for booking, provide valid date that can offer before/after their desired date.	Medium	12	2
Position of the page can be displayed differently for different platforms.	Medium	8	All
Visited links does not change color	Medium	2	All

Evaluator: Sabil Ali

<i>Problem</i>	<i>Severity</i>	<i>Applied heuristics</i>	<i>Problem element</i>
The main page contains a lot of non necessary links	Medium	2	1
The main page contains a lot of animated advertisement, that may disturb the user attention	Medium	2, 9	1
Color-blind people may have problems finding clickable elements, since the clickability is color coded	Major	10	All
No distinction is done between content, structure and presentation of the pages, making usage of accessibility tools very difficult	Major	10	All
Position and sizing glitches appears under a gecko based browser	Low	8	All
The interface doesn't behave correctly under a gecko based browser: can't go further after selecting the trip	Major	8	2
No contextual help	Major	5	All
Usage of the name : FAQs to refer to help	Major	3	All
Very simplistic and incomplete help system: only provide a linear set of Frequently Asked Questions	Medium	5	4
The partners scrolling list is useless and disturbing	Low	2	1
Home and Flight buttons are redundant and may create confusion among users	Medium	14	1
Searching takes a lot of time	Medium	7	2
Makes use of Flash animations which defeat screen readers	Major	10	1
Use of non-standard links ie. links are sometimes not underlined	Medium	3, 9	All
The use of Flash animations is useless and contributes to the interface cluttering, without bringing any benefit to the user	Medium	2	1
The User registration form contains unnecessary inputs	Medium	2	5
Pages when printed are being cut-off because of the use of fixed width design	Medium	9	All
The website provide a single style sheet for screen output, printing a page result in ink wastage	Low	9	All
Usage of white text on cyan background makes text very difficult to read, the contrast is low in such cases	Medium	3, 9	All