

AIM : Identify and evaluate usability value of an e-learning website. Usability Measurement Tool for E-Learning (UMTEL)

OBJECTIVE :

After performing this experiment

1. You will be able to describe website usability criteria.
2. You will be able to learn how to identify usability problems in a website.
3. You will be able to use an online usability measurement scale for finding usability value of an e-learning website.
4. You will be able to compute the extent of conformance to usability norms for various website design parameters of an e-learning site.
5. You will be able to understand the design heuristics involved in the construction of a new e-learning website.

THEORY :

1. Explain HMI and E learning.

E-learning course cannot be effective unless we understand the human factors like the learner's psychology, learning needs and behavior. HMI studies in this area attempt to explore learning interfaces, pedagogy and learning experience design.

Few research topics concerned with HMI and E-learning are-

- Parallelism in learning interfaces.
- Learner communication behaviors
- Cognitive understanding using multimedia
- Effectiveness of static and dynamic visuals
- Interfaces for collaborative learning
- Learning through direct-touch horizontal interfaces
- User interfaces for supporting innovation
- Design rules for effective learning interfaces

The effectiveness and efficiency of an e-learning website can be determined by measuring user's interaction patterns while using such a site. Measuring usability has many dimensions. A tool specifically designed for e-learning is often used to collect various performance data. This data is analysed by the tool to reveal patterns.

2. What is E learning.

E-learning is the mode of learning through electronically supported teaching material. In a larger context it makes use of information and communication technology (ICT) to build a online learning community by connecting knowledge centers to distant learners. E-learning is looked

upon as the most flexible and cost-effective mode of learning anytime, anywhere at your own pace mainly out-side class-room set-up.

3. Explain Usability criteria for websites.

1. Accessibility: Making users with disabilities perceive, understand, navigate, and interact with the website. In short avoiding anything that might keep a visitor from being able to access the information on a website. Few checklist points are mentioned below.

- Site load-time should be reasonable (avoid flash & add-ons)
- Text-to-background contrast should be adequate for readability
- Font size/spacing should be easy to read
- Images should have appropriate ALT tags.
- Site should have a custom not-found/404 page.

2. Identity : A website should quickly and clearly project its identity , its goals and its trustworthiness to the user. Few checklist points are mentioned below.

- Company logo should be prominently placed
- Use of tagline is recommended to make company's purpose clear
- User should get the company information quickly
- User should get contact information quickly

3. Navigation : User should be able to view contents of his relevance and interest with less efforts. Information architecture and navigation guidelines plays a vital role. Few checklist points are mentioned below.

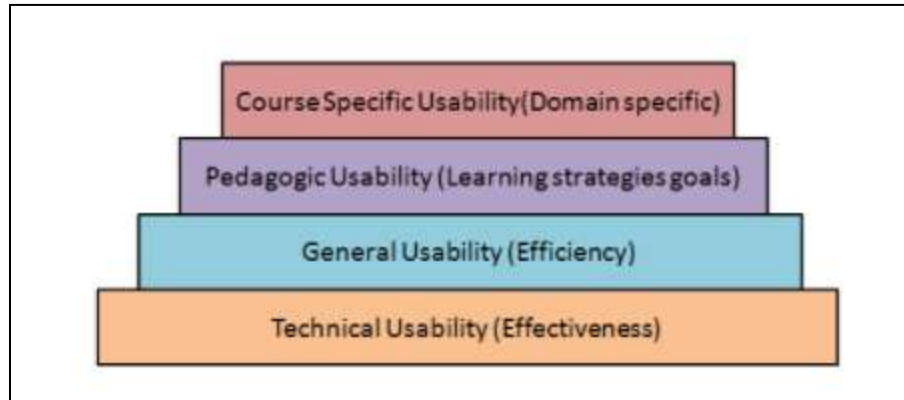
- Main navigation items should be easily identifiable
- Labels to navigation items should be clear & concise
- Number of buttons/links should be reasonable
- Links should be consistent & easy to identify
- Support user with site search feature for easy access

4. Content : Content is the most important part. Content needs to be consistent, organized, and easy to navigate through . Few checklist points are mentioned below.

- Headings should be clear & descriptive
- Styles & colors need to be consistent
- Emphasis (bold, etc.) should be sparingly used
- Content should be concise , to-the-point & self-explaining
- URLs should be meaningful & user-friendly

Pedagogic Usability

Pedagogic Usability denotes whether the tools , content , interface and tasks of the e-learning environment support various learners to learn in various learning contexts according to selected pedagogical objectives. There are several layers of website usability in context of learning like context-specific, pedagogic, general and technical usability. This is as shown below



TOOL :

IIT guwahati provides a Shakshat Virtual lab wherein out of multiple virtual labs one of the lab is based on Usability Measurement Tool for E-Learning (UMTEL). For using the tool we first need to find a education website (in our context we use (<https://www.edx.org/>)). Now we use the simulator tool of the website for evaluation of usability value.

PROCEDURE :

1. In this experiment, you will be using an online tool named UMTEL to evaluate usability of an e-learning web-site of your choice (target website).
2. The online Usability Measurement Tool for E-Learning Sites (UMTELS) is composed of six sets of checklists.
3. These checklists belong to the following categories.
 - a) Content & Readability
 - b) Navigation
 - c) UI Design
 - d) Performance
 - e) Pedagogy I
 - f) Pedagogy II
4. Each check-list has six statements.
5. The checklist statement describes usability aspect of the website for a specific category.
6. You are supposed to inspect the target website and judge to what extent do you feel that the statement shown in the tool is correct for that website.

7. Record your response whether you strongly agree , agree , fair , disagree or strongly disagree to the statement - by checking the relevant radio button below the statement.(Refer to the figure above)
8. Your response to each statement in the checklist will be assigned points by the tool automatically as follows

Response	Strongly Agree	Agree	Fair	Disagree	Strongly Disagree
Point	1.00	0.75	0.50	0.25	0.00

9. After you finish recording your responses for a category, you can move to the next category in the tool by clicking on the relevant tab within the tool. You may review the website in any sequence you wish.
10. After you finish reviewing the target website using all six checklists in the tool you can view the results by clicking the tab “Find Website Score”. You will need to press another button “Click To Refresh Scores” to see the usability scores. The result table will display total points for each category and its usability level as shown in the image below. On the right hand side you will see a level indicator which indicates summed up scores in a graphical form. When one has multiple sites to compare such a level indicator gives a visual understanding of sites in comparison to each other.
11. Usability level for each category is assigned using the table below.

Usability points	$0 \leq X \leq 0.2$	$0.2 < X \leq 0.4$	$0.4 < X \leq 0.6$	$0.6 < X \leq 0.8$	$0.8 < X \leq 1.0$
Usability Level	Poor	Bad	Moderate	Good	Excellent

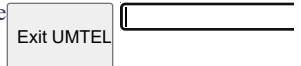
IMPLEMENTATION :

Below is the evaluation of edx.org and to check if it is usable or not as a e learning website.

Usability Measurement Tool for E-Learning Sites (UMTEL)

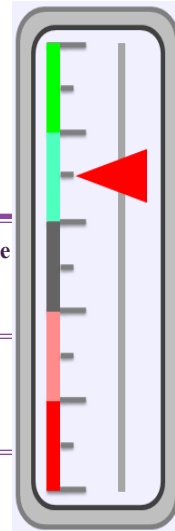
1. Open the e-learning web-site you want to evaluate in another browser window.
2. Select check-lists from the tabs below for evaluating features of the website.
3. Record your responses for each statement in the check-list by referring to the e-learning web-site.
4. Complete the full check-list. Do not leave any responses blank or unchecked.
5. Finally select the tab **Find Website Score** and click on **Click To Refresh Scores** button to compute usability score
6. You can revisit any tab or check-list and change your responses. You will need to once again compute the score.
7. Please **save your data** by taking **Print** of the checklist before you close the active UMTEL browser window.
8. To exit click **Exit UMTEL** button.

- [Content-Organisation](#)
- [Navigation](#)
- [User Interface](#)
- [Performance](#)
- [Pedagogy - I](#)
- [Pedagogy - II](#)
- [Find Website Score](#)



Content-Organisation

1.This website contains most of my interest material and topics and they are <input type="radio"/> Strongly Agree <input type="radio"/> Agree <input checked="" type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree
2. I can easily find what I want at this website <input type="radio"/> Strongly Agree <input checked="" type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree
3. The content of this website is well organised. <input checked="" type="radio"/> Strongly Agree <input type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree
4. Reading content at this website is easy <input checked="" type="radio"/> Strongly Agree <input type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree
5. I am comfortable and familiar with the language used. <input type="radio"/> Strongly Agree <input checked="" type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree
6. I need not scroll left and right when reading at this website <input type="radio"/> Strongly Agree <input type="radio"/> Agree <input checked="" type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree



Navigation

1.I can easily know where I am at this website. <input type="radio"/> Strongly Agree <input checked="" type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree
2. This website provides useful cues and links for me to get the desired information <input type="radio"/> Strongly Agree <input type="radio"/> Agree <input checked="" type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree
3. It is easy to move around at this website by using the links or back button of the browser. <input checked="" type="radio"/> Strongly Agree <input type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree
4. The links at this website are well maintained and updated. <input checked="" type="radio"/> Strongly Agree <input type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree
5. The website does not open too many new browser windows when I am moving around. <input type="radio"/> Strongly Agree <input checked="" type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree

6. Placement of links or menu is standard throughout the website and I can easily recognise them.
- ☐ Strongly Agree ☒ Agree ☐ Fair ☐ Disagree ☐ Strongly Disagree

User Interface

- 1 This website's interface design is attractive.
- ☐ Strongly Agree ☒ Agree ☐ Fair ☐ Disagree ☐ Strongly Disagree

- 2 I am comfortable with the colours used at this website.
- ☐ Strongly Agree ☐ Agree ☒ Fair ☐ Disagree ☐ Strongly Disagree

- 3 This website contains no feature that irritates me such as scrolling or blinking text and looping animations.
- ☐ Strongly Agree ☒ Agree ☐ Fair ☐ Disagree ☐ Strongly Disagree

- 4 This website has a consistent feel and look.
- ☐ Strongly Agree ☒ Agree ☐ Fair ☐ Disagree ☐ Strongly Disagree

- 5 This website does not contain too many Web advertisements.
- ☐ Strongly Agree ☒ Agree ☐ Fair ☐ Disagree ☐ Strongly Disagree

- 6 The design of the website makes sense and it is easy to learn how to use it.
- ☐ Strongly Agree ☒ Agree ☐ Fair ☐ Disagree ☐ Strongly Disagree

Performance

- 1 I need not wait too long to download a file or open a page.
- ☐ Strongly Agree ☐ Agree ☐ Fair ☒ Disagree ☐ Strongly Disagree

- 2 I can easily distinguish between visited and not-visited links.
- ☐ Strongly Agree ☒ Agree ☐ Fair ☐ Disagree ☐ Strongly Disagree

- 3 I can access this website most of the time.
- ☐ Strongly Agree ☒ Agree ☐ Fair ☐ Disagree ☐ Strongly Disagree

- 4 This website responds to my actions as expected.
- ☒ Strongly Agree ☐ Agree ☐ Fair ☐ Disagree ☐ Strongly Disagree

- 5 It is efficient to use this website.
- ☐ Strongly Agree ☒ Agree ☐ Fair ☐ Disagree ☐ Strongly Disagree

- 6 This website always provides clear and useful messages when I don't know how to proceed.
- ☐ Strongly Agree ☒ Agree ☐ Fair ☐ Disagree ☐ Strongly Disagree

Pedagogy - I

- 1 Website provides tools to support learning/authoring and collaboration viz. chat , discussion forum , sharing contents , podcasting etc .
- ☒ Strongly Agree ☐ Agree ☐ Fair ☐ Disagree ☐ Strongly Disagree

<p>2 This website provides excellent motivation to learn <input type="radio"/> Strongly Agree <input checked="" type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree</p>
<p>3 Website can effectively give feedback or guidance by assessing the progress and knowledge gained by the learner at any time. <input type="radio"/> Strongly Agree <input type="radio"/> Agree <input checked="" type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree</p>
<p>4 The website always keeps track of learners progress / performance and informs through appropriate feedback. <input checked="" type="radio"/> Strongly Agree <input type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree</p>
<p>5 Website improves critical thinking and prevents you from memorising information <input type="radio"/> Strongly Agree <input checked="" type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree</p>
<p>6 The website provides an excellent problem solving environment <input type="radio"/> Strongly Agree <input checked="" type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree</p>

Pedagogy - II

<p>7 The website provides analysis and personalization of learning paths. <input type="radio"/> Strongly Agree <input checked="" type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree</p>
<p>8 The website content support the activities of the designer <input type="radio"/> Strongly Agree <input type="radio"/> Agree <input checked="" type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree</p>
<p>9 The website contents and interactions adapt to the learner profile and learning style <input type="radio"/> Strongly Agree <input type="radio"/> Agree <input type="radio"/> Fair <input checked="" type="radio"/> Disagree <input type="radio"/> Strongly Disagree</p>
<p>10 The website supports all the tasks of concern to teachers and students in during teaching-learning process. <input type="radio"/> Strongly Agree <input checked="" type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree</p>
<p>11 Website provides clarity of learning goals , objectives and outcomes <input checked="" type="radio"/> Strongly Agree <input type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree</p>
<p>12 Website provides learner to find their own learning pathways <input checked="" type="radio"/> Strongly Agree <input type="radio"/> Agree <input type="radio"/> Fair <input type="radio"/> Disagree <input type="radio"/> Strongly Disagree</p>

Find Website Score

No	Category	Score	Level
1	Content-Organization-Readability	0.7500	Good
2	Navigation and Links	0.7917	Good
3	User Interface Design	0.7083	Good
4	Performance And Effectiveness	0.7083	Good
5	Pedagogy	0.7500	Good
	Overall	0.7417	Good

[Click To Refresh Scores](#)

CONCLUSION :

From this experiment, we learnt about identifying and evaluating usability value of a website. For this we first understood how human machine interaction is connected with websites like e-learning websites. We understood the different usability criteria that are required for a website to become an excellent usable website. Finally we used IIT guwahati UMTEL tool with edx.org website which is an e-learning website, for its evaluation and found out its overall score was 74.17% which is under usability "GOOD".

REFERENCES :

1. <https://hci-iitg.vlabs.ac.in/umtel.html>
2. https://hci-iitg.vlabs.ac.in/umtel_simulator.html
3. <https://www.edx.org/>

POST LAB QUESTION ANSWERS :

1. Enumerate website usability criteria.

Answer :

1. Accessibility
2. Identity
3. Navigation
4. Content
5. Pedagogic Usability

2. Discuss the website features essential for pedagogic usability.

Answer : Pedagogical usability should be the focal point of e-learning design. It denotes whether the tools , content , interface and tasks of the e-learning environment support various learners to learn in various learning contexts according to selected pedagogical objectives.

Some features can be :

1. Providing motivation to learn
2. Track progress of learner
3. Providing discussion forums,chats,etc.
4. Provide problem solving environment