

Online Education: A Heuristic Evaluation and Comparison of e-learning Features

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Abstract - For distance educations, E-learning is a most popular tool. The core of e-learning is LMS (Learning Management System) and CMS (Course/Content Management System). These system helps College/Universities automates managing of Educational events. The main purpose of this paper is to study, analyze, and explore for the right decision while choosing among various Virtual Learning Platform (VLE), to meet the requirements of Learners. We take some popular e-learning platforms and done the comparative study for heuristic evaluation with respect to Jakob Nielsen's principles for interaction design.

Keywords - *E-learning, LMS, CMS, VLE, Heuristic.*

1. Introduction

1.1 Background

The history of education in India is very rich and interesting. All these education system based on classroom based i.e. active teaching from the era of Buddhism the world famous educational institutions like Nalanda, Vikramshila and Takshashila was established. Today in the 21st century with hundreds of universities and thousands of affiliated colleges, India has positioned itself comfortably as a country that provides quality higher education to its people in specific and to the world in general. On 1960 PLATO (Programmed Logic for Automated Teaching Operations) system developed at the University of Illinois at Urbana-Champaign. This system delivers managed course content over the Internet. From here journey of Learning Management System started. A learning management system (LMS) is a software application for the administration, documentation, admission, tracking, and reporting of training programs, classroom and online events, e-learning programs, and training content. By using this system:

- Organization can easily conduct distance learning courses.
- Students can easily study and giving exam according to their suitable time.

- Students can take admission from anywhere of the world without manually going organization.
- Students can fill up the exam from anywhere.

Education is the combination of Teaching and Learning. In pre-literate societies, education was achieved orally and through observation and imitation. The young learned informally from their parents, extended family and grandparents. After that students are sending to Institutes (named as GRUKUL) for education. From 18th century Modern Education started. This education is class room teaching. John Dewey is recognized as the Father of modern education.

But the main problems of class room education system are:

- It is only active learning.
- Student and teacher are should present in same place at the time of teaching.
- Here is no option for distance learning for distance students.
- There is a problem of time overlapping, so no option of study for working people.
- No option for flexible timing/learning, so no option for Students who are unable to complete their study.

For these reason distance learning is introduced. Virtual learning environments have been available since 1960. Any business in the world today cannot survive without online services (Paul Jackson, Lisa Harris and Peter M. Eckerseley).

The trends of learning would definitely make learning easy for every individual who desires to do so. The growing impact of e-learning technology fits in with the larger transformation towards a knowledge-based society. A number of researches promoted the design of Computer based learning materials which fulfill target users need, benefit of distance learning, and architecture of learning management system.

1.2 Heuristic Evaluation

Heuristic evaluation is a usability audit which fosters to identify the usability problems in User Interface (UI) design. It is defined by Jakob Nielsen in 1994.

1.3 Learning Management System (LMS)

An LMS is the umbrella over all of a Universities/Institutes/company's authoring tools and courses. It is the organizer that performs critical administrative tasks: managing, delivering, and tracking training over the external Internet or internal Intranet. The LMS is a strategic e-Learning facility that must work seamlessly with the courses and the databases that hold the training records.

1.4 E-learning

Electronic learning or e-learning is a way of teaching leaning system via electronic media, especially online. E-learning will be successful on the condition of self-motivation.

1.5 Why e-learning

Reduce material cost like paper, board, pen etc.
 Time saving
 Increase productivity
 Decrease time overlapping and other scheduling problem
 Real time access
 Personalized study
 Encourage sharing
 Easy to open for students
 Social cause: To reach to the end person of society.

2. Nielsen's Usability Heuristics

1. Visibility of System Status
2. Match between system and the real world
3. User control and freedom
4. Consistency and Standard
5. Error prevention
6. Recognize rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognized, diagnose and recover from error
10. Help and Documentation

3. Features Summary of different e-learning and LMS tools

There are several Learning Management system and e-learning software. We take four software like Moodle 3.0, Massive Open Online Courses (Mooc 4.0), Edmodo and Google for comparative study.

Table 1: Summaries of the Expected Features

1.Learning Tools	2.Help/Support Tools	3.Technical Specifications Tools
i. Interactive tools <ul style="list-style-type: none"> • Orientation of course • Video Services / Whiteboard • File Exchange / Internal • Online Journal/Notes • Discussion Forums • Email • Real-time Chat • Feedback 	i. Administration Tools <ul style="list-style-type: none"> • Authentication • Course/Assignments • Authorization • Registration Integration • Hosted Services • Report submission and Editing • Upgrading • Tracking 	i.Hardware/Software <ul style="list-style-type: none"> • Client Browser Required • Database Requirements • Server Software • UNIX Server • Windows Server • Antivirus
ii. Productivity Tools <ul style="list-style-type: none"> • Calendar / Progress Review • Searching Within Course • Bookmarks • Work Offline/Synchronize • Orientation • Help 	ii. Course Delivery Tools <ul style="list-style-type: none"> • Course Management • Instructor Helpdesk • Online Grading Tools • Student Tracking • Automated Testing and Scoring • Forum 	ii. Pricing/Licensing <ul style="list-style-type: none"> • Company Profile • Costs • Open Source • Optional Extras • Software Version
iii. Student Corner Tools <ul style="list-style-type: none"> • Self-assessment • Group work • Student Community • Building • Student Portfolios • Tracking courses, facul 	iii. Curriculum Design <ul style="list-style-type: none"> • Curriculum Management • Course Templates • Customized Look 	iii.Network <ul style="list-style-type: none"> • Speed • Bandwidth • Mobile network • Connectivity

ties	<ul style="list-style-type: none"> and Feel • Customize text, images. • Instructional Standards • Compliance • Instructional Design Tools • Content Sharing / Reuse • Accessibility Compliance 	
iv. Management Tools <ul style="list-style-type: none"> • Management of course/Activities/Resource/Questioners/Groups/Reports • Addition extra Text • Enrollments • Result Display • Result analysis 	iv.Quick links <ul style="list-style-type: none"> • Admin • Grade • Installations (free s/w /plugins) • Quiz • Teachers • Learners 	iv. Mobile applications tools <ul style="list-style-type: none"> • Mobile versions • Mobile software

4. Comparative Study Table with respect to Heuristic Evaluation

Here provides the comparative study table with respect to Jakob Nielsen's heuristic principles for interaction design.

Table 2: Comparative Study Table

Features	E-learning Platform			
	Moodle	Edmodo	Mooc	Google
Visibility of System Status	Y	Y	Y	Y
Match between system and the real world	Y	Y	Y	Y
User control and freedom	Y	Y	N	N

Consistency and Standard	Y	Y	Y	Y
Error prevention	Y	Y	N	N
Recognize rather than recall	Y	Y	N	Y
Flexibility and efficiency of use	Y	N	N	N
Aesthetic and minimalist design	Y	Y	Y	Y
Help users recognized, diagnose and recover from error	Y	Y	Y	Y
Help and Documentation	Y	Y	Y	Y

5. Comparative study

5.1 Moodle (Modular Object-Oriented Dynamic Learning Environment)

As per research "Big Changes in the Top 20 Most Popular LMS Ranking" published in October 15th, 2014 by JP Medved in LMS Moodle is no.1. Moodle is an open source, free, most popularly used e-learning or LMS platform launched in 2002. It has currently 68 million users worldwide and its growing on. It is easy to use and has offline features. As it has both online and offline features in heuristic point of view as well it has all features.

5.2 Edmodo

Edmodo is an online networking application, which offers communication, collaboration and teaching tools launched in 2008. It offers for mainly for K-12 students. It is not open source and is an online tool. It is ranked in no.2 worldwide. Edmodo is like facebook. It uses to provide all features but analysis, offline use and whole management of course is excluded. Here flexibility and efficiency of use features is excluded because learners depend on internet.

5.3 Mooc (Massive Open Online Course)

Mooc is a free web based distance learning program introduced in 2008. This is an e-learning tool. Distance MBA first introduced by Mooc. Only contrarian is it needs good bandwidth, seed and memory space. Mooc only provides online features so user flexibly and freedom is automatically cut down. User/Learners depends on timing of classes. But they and avail chat as per their need.

5.4 Google

In 2012 google introduced its e-learning and LMS features by Google Drive, Google Classroom, Google+, Search, Vedio, Calender, Organizer, Translator, Photos etc. As Google is a world's number one browser as per **Alexa Traffic Ranks** (Global), its education features are also popular rapidly. But major constraint is high speed and good bandwidth internet connection and gmail account is mandatory. And also it performs more properly in Google Chrome browser. As a heuristic point of view Google excluded user control and freedom and flexibility and efficiency of use as here also user depends on internet and time flexibility problem.

6. Conclusion

As per the comparative study we see that most of the heuristic features follow by Moodle and Sakai while other three Edmodo, Google and Mooc are not fulfill all heuristic approach. So we can conclude that Moodle is a better option as VLE. The study also leads that all these VLE are not considering the emotion, moods and the fillings of learners. So the heuristic approach can be extended in future to study from these points of view.

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