

A Novelty Approach of Usability Testing Method in an E-learning Environment

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Abstract—In earlier stages of last century, the Moodle Open-Source Management System use was implemented by framing the curriculum with the means of personal computers, laptops, electronic media and the hard copies of course book that made them difficult to keep it as a repository as an updated one. The students' learner communities can able to download the learning materials and contents with the help of online resources and tutors who has rich experience in the academic field for guiding the learners to learn the contents in a fast manner. Blended Learning Method was another important effective form for a vast number of courses. In the perspective of e-learning, Moodle was used to support learning and training activities, which employs the questionnaire strategy pattern to evaluate the learner's satisfaction for their gain of knowledge. The outcomes will arrive through a mechanism of delivering the e-content and the proper way of framing the syllabi and curriculum for the subjects in the real-world scenario.

Web Mining can be deployed as a tool for finding the activities by the user by implementing the Web Usage System thereby the user will not reveal it personally to the outside world. But with the intent of using log files in the Web server, one has the solution to track the user's action and can identify the student's behaviour by matching the data with the grades obtained that are given to a tool to find the uncover parts of the learner activities by using the web usage implementation which has not revealed to the user personally. By using the web server's log files, one can able to track the Web Server's log files, user's actions so that can identify the student's behaviour by matching the grades with the input data that is given for identifying successfully the learning strategies. The results obtained is of the nature that will be qualitative and quantitative one that has resulted one by applying the data mining tools to be deployed in e-learning systems.

Index Terms— Usability, Data Mining, Web Mining, e-learning, User Analysis.

I. INTRODUCTION

E-learning plays a major role in a learner life with the high motive of developing and gaining rich knowledge by way of data and information to apply in the real -world applications, During the period of Covid-19, the world saw the development of rise of e-learning tools, contents, applications with an insight knowledge of developing rich user experience in the academic environment. Both the teaching and students' communities gained rich knowledge and vast amount of information with the help of e-learning methods^[1]. The e-learning methods

employs the methods of web mining and data mining tools to find a hidden knowledge of information available in the world.

A. e-learning courses in present environment

Now-a-days, Course Management System (CMS) has become popular in the learning of graduate courses. In the developing countries like India, Open-Source Learning Management System and Course Management System (CMS) are equally available in academic side. Since both LMS and CMS are cost-wise cheaper one, it is vital boost to the teachers and the learners to gain a hands-on experience in their respective field. The social, economic environment and the contents in the system should support the process of learning in a proper adequate manner that should avoid the clustered interfaces. The problem that as a learner is facing must not avoid the transmitted data and information that should focus on the cognitive aim.

B. Usability Criteria in e-learning environment

According to the qualitative aspects in terms of software products by means of Barker's and King's (1993) terminology, the terms are given below:

- Interest and Identification of the learner
- Interactivity by the learner
- tailoring the needs of the learner
- mixing multimedia content
- interactive style of the learner
- measuring the quality of interaction between the learner and system
- develop learning styles
- monitor and assessing techniques
- tool for integration of intelligence
- support tools that are ready to learn

The above terminologies mainly focus on the educational aspect for attaining the quality of interaction in terms of software ergonomics. The focus of the research must be on the aspects of interaction and quality and the ways for identifying the learner methods.

In today's scenario, E-courses face the dropout's ratio in a higher-level intensity and because of this the gain of scores has decreased thereby the credits has fallen in an alarming factor which should be motivated to the learners thereby they will gain full confidence in learning the contents^[2]. There exists no interaction between the student and the learners and also between the peer-to-peer group learners for sharing the information what they have gained. If this is resolved, the learners can able to get the credits in their subject. Our e-learning environment should focus to create a network with the help of social forums, groups, chat systems so that it will improve the knowledge gain. The Wikipedia and face-to-face interaction between the students and learners that will improve the cognitive knowledge by ways of conducting the practical activities and the cognitive behaviour.

C. Usage and Usability in e-learning environment

The questions that are raised is a concern to the usability of the e-learning content environment thereby one has to find who is using the contents, what's the purpose of accessing materials or contents and has to find the ways of finding the results. When e-learner finds the solutions for the above problems, the usability of e-learning contents can be found out. Usability testing process is involved in the human-computer interaction are measured, and the correction towards the weakness are incorporated^[3]. This type of testing ranges from the structured ones to highly informative one, but it's a time-consuming process and can be tested as a freeware. The testing styles should focus on the interaction between the user and the contents and specify the ways of testing for accessing the performance of the e-learning system.

Exploratory testing will study and examine the system in the e-learning system and looks for the slow-down process. The e-learning environment system looks for all possible areas of slow-learning issues. The testing will be performed with no notion involved whatever the form it may take with respect to the problems. The deliverables are given as a sample test value to carry out the exploratory test for further examination. This testing is used in early stages of life cycle while developing the e-learning product. Threshold testing measures the system performance to generate a pass or fail effort which is a beta release stage in the environment. Comparison testing is another strategy that will measure the characteristics of two design approaches that is carried out to suit the user needs. Measurability testing is a time-consuming factor in analysing the user interfaces, and their contents that are applied as a method for software ergonomics^[4]. This will analyse the pattern of cognitive knowledge, heuristic information, the empirical methods like questionnaires, enquiries,

monitor the user's activity, groupism methods and one-to-one interaction analysis. While comparing the measurability testing against the nature of the monitoring system data, the environment gives the solution that are adequate in nature. The data that is used for evaluation purposes will eliminate the difficulty of evaluating the databases, log files that are raised by the students while accessing the contents for better utilization. The identification of individual ones should be taken by the learner while facing the e-contents. This can be exploited by the way of data mining techniques.

II. EXPLORATION OF DATA MINING TECHNIQUES IN MEASURING THE USABILITY

The questionnaires usage has the limit by following set of options like identifying the potential tutors to clarify the learners' doubts, their contents so that the learners can remember to solve their query. The files will contain about the interaction of user with the product and the basic elements of curriculum that will identify the user's habits. In current market, numerous software's like SPSS is available that will analyse the log files in web server^[5]. These programs will contain the concept of integrated induction methods used for web pages. By the way of induction methods that are practised will be deployed in an e-learning environment. Learning Management Systems (LMS) has a built in and integrated module that will focus on the record of a specific user's activity like their access of data or downloading the particular element in the curriculum. This is not sufficient to forecast in identifying the coherence. Data Mining Software is used mainly for monitoring the web pages that will forecast the user behaviour. The individual elements must support the log files of the web pages and its integration. But this can be added in the field of mathematics as an added advantage.

The integrated nodes are used in the following ways that are given below:

- Data base for the input which is selected by the user
- Node will be used to perform the screening process for a given set
- Filtration of data that is focussed should be a goal-oriented one
- Aggregation of data for establishing the connection
- Retrieval of data

The learning objects can be represented as graphical visualization to the result. The data exchange can be done by analysing the proper utilization of e-learning courses. The learners and tutors must evaluate the blended learning type courses for obtaining their opinion in the teaching method, curriculum followed they will face while teaching and learning respectively.

The criteria measures will determine whether data mining techniques is applied or not is given below:

- Design of well-known User Interface
- The identification of users (both students and teachers) is very well known
- Lay-out of Requirement Analysis for identification of the course.

The above-mentioned attributes of the software that is used for analysing the data procedure is designed for maintaining the web pages commercially which pose some difficulties to the user^[6]. The tutors and learners should redesign the methods that are readily available.

The data must be converted into information and thereby the usability methods can be applied with the help of Moodle E-Learning Environment that will support the large number of data items. Moodle Software will store the information in the form of data tables that are nearly around 200, which is enough for mining the data. The data that is interpreted and the activities are carried out with the help of data mining tools to test the process in an effective way.

A. Determination of Quality Factors

The questions that are mainly concern about the educational portal determination and its topics with respect to its course sheets, curriculum elements that are considered as a part of quality assurance.

Based on the above, the quality factors will define:

- Usability Factor will define to achieve consistency, simplicity
- Effectiveness calculation has to be done for finding work efficiency, learnability, its time spent to meet the personal needs
- Motivation Factor that will determine the behaviour of e-learner
- Communication can be increased between the participants

The data mining methods can be applied to calculate the consuming time and its usage time.

B. Research Factors in the Supporting System

The e-learning management system moodle stores about the interface actions in SQL database. This will keep the record of identification of user about the individual data elements in SQL database. The implementation and interpretation will meet the objective of datamining techniques. The focus was on clementine software:

- Analysis of the individual user's roles in terms of identifying the courses
- Measurable indicators for identifying the curriculum elements and their role in assessing the course sheet
- Through examination phases, the courses will be checked in context of independent learning, the knowledge of the learner that is gained through practical work
- The throughput of the individual course and Identification of the learning habits with the help of results reached^[7].

C. Identification of Objects in e-learning environment

C.1 Comparison of the activities carried out on the course sheet.

The learning activities will be analysed in the activities that is a concern to the individual elements of the curriculum to know about the learning methodologies during a single visit. This will change obviously the professional forums, like the question of students that is posted for interpreting the curriculum so that the learner can pose the tutor while learning the new concepts.

C.2 Indication of tenure of communication tools

The communication plays an important role between the learners and the tutor to exchange and share the information in terms of courses, number of participants, content writers, and organisers.

The following terms are used as an indicator for assessing the communication tools:

- Forum is a place for sharing the information like questionnaires and answers among peer groups.
- Messages are shared between tutors and students.
- Chat has been enabled as a gateway between the teachers and students

The appraisal of study sheets of the learners can be carried during their examinations. All the student's activities should be done by formulating a test plan to assess their knowledge gained with the help of contents. This is done with a notion of achieving the success in terms of its usage is tests and their study sheets. All student activities should be done in a written communication manner by practice tests to attain the high successful rate. In handling the courses, the individual elements of the curriculum and the information should be readily available as a tool to write the tests^[8] sufficiently.

C.3 Analysis of Forums

The examination forums should be formed that will serve as a tool for the questionnaire sessions to the students. With this forum, the tutorials can be formed and examined in a particular course in the curriculum. In each forum, the learners can post their doubts that are rising out to the tutors regarding the subject to be selected and the outline that has to be prepared and the last one shows the way to handle the subject in terms of assignment.

C.4 Examination of Chatting room

The chatting function can be enabled extensively in a course for analysing how many students have actively participated in terms of supportive collaboration work to analyse their knowledge in the subjects they have learned and keep it alive during the entire learning. This chat-function is used in such a way to analyse the student's learning behaviour which cannot be followed in the conventional teaching method on a regular basis. In a system carried out, out of active 100 participants of a particular course, only 60 participants participated in the test and 15 responded with a single word in the subject line. One Students responded nearly 20 times in a chat function. The testing function was enabled as a free tool to the students to carry out the tests and the visits to the chat function were used to evaluate the gain of learner's knowledge.

C.5 Analysis of Debate Page

The individual elements like wiki will support the tasks that make a way to analyse collaboratively in the real time. The tutors can track its author, usage and the right way to track the pace for the wiki elements that will support the tasks to be solved in real time^[9]. The tutors' responsibility is to track the current happenings and the liberty to make changes in the page. The analysis should be done in a fast manner to assess the performance of individual learners. The curriculum individual elements should be supported by extending a way to store the information in a collaborative work interface for storing the information and extended by supporting the information storage for providing a means of collaborative work interface so that all the participants would able to benefit.

The common questions are posted to the learners for understanding their knowledge gained.

- Who has edited the information?
- When the information has edited? (time; before, after, intensity)
- Who has read the groups' task and read the tutorial?
- What is the content available in the discussion page?
- Frequency of activities in the page

In the performance of individual assignments, the learners mainly focus on the contents available in the course material and the way to complete the assignment in a fast manner with a collection of collaborative work between them.

III. ANALYSIS OF LEARNERS

In terms of learning activities with respect to students' learning strategy, the learner will assess the individual curriculum elements like downloaded contents, self-assessment tests and the contents will be notified. This makes the way of assessing the knowledge gained by the students learned. The learning will make the way to assess the individual elements for its usage, and the ways of results obtained. For a learning strategy, examine the curriculum elements that will influence the results at the end of the tests.

A. Results of User Activity

In context of association analysis, apply the rules that will occur most regularly evolve among the probable variables in an important role. Analyse a learning strategy with the help of user who will examine the curriculum elements' frequency and the practice tests taken by the learner. The learner can acquire the required knowledge in terms of practicality^[10] by utilizing the e-content resources. The more the learner engages, higher the result will be. The outcome of the test will confirm the higher success rate once they complete all the individual tests of the curriculum. But it does not depend entirely whether the learner has acquired the knowledge as a set of level. The research fails to provide the expected results to make the own decisions, the difficulty of evaluating the course sheets by the tutor. Here the focus must be given on the downloading time and the way to access the curriculum individual elements.

B. Usage of Classification Analysis

In the classification analysis, the learner can be categorized based on whether they are following conventional method types to upgrade their gained knowledge with the help of theory and practical sessions by applying the individual elements that are seen in the curriculum. But with the learning method strategies, the types of students can be differentiated by means of whether they are learning only the theoretical parts or doing some practical sessions to assess them. Some of the learners are just passers and last time rushers to learn the eLearning contents^[11].

IV. FUTURE OF THE VISION

The evaluation method of usability not only ends with a release of system or product but also on the usage of standard web server or its logs as an valuable source of information since the availability and usage of patterns can be found out in a live manner^[12]. The testers must employ the knowledge of usability experts and it is one way not needed for the analyst's people to judge the system. The learners' different styles can be analysed and identified based on the curriculum's individual elements with a prediction of learning objects thereby a pivotal thought can be formulated and gained. Based on their performance, a strategy can be given to the learners to acquire different types of learning and its style to adept and accept the new changes. The tutor can manage as a community for measuring the learner's knowledge with the help of data mining tools that will be used in assessing the communication strategies employed. Data Mining Tools can be used as a tool to rebuild or modify the proof that is an operational one to find the new hidden or information available. The occurrence of keywords is hard to interpret in the forums and it makes the way for the learners as an interesting one to find out the new information. This one paves the way to collect the collaborative learning process with the help of missing individual elements. The tutor can integrate the usage of Wikipedia for the educational purpose which will be a highly successful one among the students^[13]. The tutor may use the modules similar like that of any online web conferences that is readily available to attract the learner to participate in more number so that it will facilitate the e-learning environment for supporting the real time communication, sharing of files in the form of e-contents between the participants.

The e-learning environments has an impact in today's life in both teaching and learning strategies by applying various Information Communication Tools that is available nowadays^[14]. But the tutor has to bear in mind that the learners' style, their habits, strategies are always changeable. The student's learning habits in an e-learning environment can be studied by logfiles. The web mining techniques paves the way for exploring the possibilities between the data usage and will increase its efficiency^[15].

V. CONCLUSION

The ways of analysing data in terms of e-learning environment paves a way for efficiently using both the contents and user interfaces to create an effective system for independent learning process. This is achieved by establishing a connection between the requirements by collecting log data files of individual learners with respect to their learning activities and results. Also, comparison of individual tasks with the learning activities like the successful execution of the tests will access the readings, attending the tests and forums. The learner's learning styles and their habits can be studied to make better personalization of learning instructions to enable the learners to go for new higher ideas and concepts. The analysing methods has been used as a way by the user's data activities and as the system parameters which will identify the user interface and learning contents. The data can be further identified to influence personal performance parameters that will deploy an assistive system for fast learning methods in an e-learning environment.

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