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An Evaluation of the Usability and Interactivity of e-Learning Platforms Used in Kenyan Universities

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Abstract. Kenyan universities have implemented e-Learning technologies but students have different perceptions regarding the usability and interactivity of these platforms. The objective of this research was to evaluate the usability and interactivity of both Moodle and WebCT e-Learning platforms as perceived by the students. In this research, Software Usability Measurement Inventory (SUMI) was used to evaluate usability perception. To evaluate interactivity, the research used interactivity parameters like read, listen and watch, response-practice and feedback, create and generate a forum, as well as real time communication. The students felt that the e-Learning platforms were not offering enough in the areas of usability and interactivity. The lack of help menus and availability of non-context specific help menu is the cause for the poor score in the area of learnability, memorability and helpfulness.

Keywords: e-Learning, usability, Kenya, university

1.0 Background Information

Existing empirical evidence demonstrates that the use of Information and Communication Technology (ICT) in the instruction processes is spreading faster than any other form of curricula change and innovation in the world (Gilbert, 1997). Thus, advances in technology have led to a paradigm shift in the instructional processes.

e-Learning is the delivery of an education program by electronic means involving the use of a computer or electronic device to provide training or learning materials. e-Learning environments can be of three types: (1) using e-Learning instruction as a supplement to face-to face instruction, (2) using e-Learning in a mixed mode with face-to-face instruction, and (3) using e-Learning instruction instead of face-to-face instruction.

To achieve the aspect of e-Learning, platforms have been developed which act as the content delivery channel to interact with the users. e-Learning platforms in most cases are hyper functional supplementing the learning situation by being neutral containers or mediators of communication and learning material.

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Kariuki (2006) states that if the websites analysis is something to go by, it is justifiable to conclude that in Kenya, institutions are a distance away from reaping the benefits of e-Learning. In his research the focus was on the accessibility of the e-Learning systems from the Internet and how some institutions have put links to the e-Learning systems that do not exist and his conclusion was that institutions need to make sure links are operational and accessibility issues need to be resolved.

In the recent past, institutions of higher learning in Kenya are in the hype of implementing the technology. However, there is poor usage of the e-Learning systems meaning that the end users are not satisfied by what is offered to them. This has to do greatly with users' perceptions towards the e-Learning platforms and the contents provided on them.

1.1 The e-Learning evaluation exercise

Buzzetto (2008) states that there are numerous tools and features at the disposal of students and instructors, and it is important for the e-Learning community to examine both preferences and usage of these features. This means that the universities may spend a lot of money in the e-Learning technology but if an evaluation is not done to ascertain users' perception to examine the usage of the features, then it will be very difficult to make conclusions on the impact of the e-Learning technology.

In 2005, an evaluation was done in Maryland State University to examine the student perception on various e-Learning components that yielded a lot of results. Through the research, the institution was able to understand the students' level of appreciation of the implementation of ICT to aid the teaching-learning process. The research also found out that the students have a lot to say as far as the WebCT e-Learning components are concerned.

Another evaluation has been conducted on the e-Blackboard instructional platform system in terms of students perceptions based on the students interactive behavior with the ICT-rich learning environment. This research was done in 2007 and aimed to examine e-Blackboard's ease of usefulness, students' attitude and cognitive behavior. Abdalla (2007) states that the results suggested that the ease of use as well as the usefulness of technology positively influences student's attitudes towards the system, which in turn determines technology's effectiveness. Perception of usefulness also significantly influences technology effectiveness.

Another evaluation was focused on SCORM-based course in dotLRN accessible platform. The main focus was to find out the users' view on the accessible e-Learning platform for Europe with respect to whether it is accommodative to users with disability and appropriateness of language used for communication. It used the W3C evaluation methodology which stands for World Wide Web Consortium (W3C).

Abdalla (2007), however, stated that limited studies have evaluated effectiveness of such new technologies. This means that many evaluations are done either to make decisions on which e-Learning platform to acquire but very few looked at the effectiveness of these platforms or the technologies to the students on the point of view of users themselves. Mandinach (1984) states that fundamental to any evaluation, however, is the identification of key questions reflective of the needs of the stakeholders, decisions on appropriate constituencies, methodology, measures, data collection methods, and designs. This is to mean that whatever the type of evaluation chosen it is the needs of the stakeholders that need to be addressed

1.2 E-Learning evaluation methods

Despite the widespread use of e-Learning systems and the considerable investment in purchasing or developing them in house, there is no consensus on a standard framework for evaluating system quality.

Evaluation methods are the criteria used to examine the various aspects in e-Learning. The widely used models are the AHP and the SUMI evaluation model. The AHP approach has been used before to help in decision making. Francesco Colace, Massimo De Santo and Antonio Pietrosanto (2006) state that according to the AHP approach they have compared the various platforms from each other, for every feature and scenario. AHP approach allows not only to evaluate the platforms but to test their application as well. This approach has been successful in helping to make choices on which platform to acquire for an institution. The SUMI approach has also been used widely to evaluate the usability perceptions of the e-Learning platforms to the users. SUMI is increasingly being used to set quality of user requirements by software procurers. SUMI has also been used to test the usability of the e-Learning content in Moodle and e-Campus. e-Campus is a web-based application, designed for the creation of web-based learning content for different kinds of courses and was intended to carry out web-based and blended learning. Through this study, it was certified that the SUMI-method is suited for usability testing, but only for the quick and simple evaluation of specific usability factors.

1.3 Usability and interactivity factors of the e-Learning platform in the evaluation of user perceptions

1.3.1 Usability

Usability is an important factor for the evaluation of e-Learning technologies and systems and that for the user of any interactive software; usability is one of the major aspects of the system. According to ISO 9241-11 usability may be defined as the extent to which a product such as software can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use and that there is strong relationship between quality and usability.

Pulichino (2004) states that usability is making sure that something works well and that a person of average ability and experience can use the thing for its intended purpose without getting hopelessly frustrated. He also states that there is overwhelming agreement that usability is essential to e-Learning.

1.3.2 Interactivity

For the e-Learning platforms to be viewed to be effective, the users' perceptions on interactivity of the platforms need to be examined too. This is because interactivity of the e-Learning platform is what increases students' retention level while using the platform. More and more e-Learning systems are available today, but many of them have limitations that hinder improvement of the effectiveness and societal potential of e-Learning.

Qualitative aspects of the evaluation centre around increased initiative in pursuing certain aspects of the courses, measured in terms of number and type of on- and off-web activities done by groups of students without the teacher's prompting. This means interactivity can only be measured by what is availed to the students in on the platform given to them.

1.4 Objectives of the research

It was therefore the main objective of this research to evaluate the usability and interactivity of the e-Learning platforms used in Kenyan universities. Specifically, the research sought to answer the following questions:

i. What is the extent level of usability of the Moodle and WebCT e-Learning platforms as perceived by the students?
ii. What is the extent level of interactivity of the Moodle and WebCT e-Learning platforms as perceived by the students?

2.0 Method and Procedure

The research design in this project is descriptive-evaluation of the e-Learning platforms used in Jomo Kenyatta University of Agriculture and Technology and United States International University. The stratified sample of students from United States International University was 90 and from Jomo Kenyatta University of Agriculture and Technology, 76 students. Data analysis has been done by use of frequency count, percentage and represented using tables.

2.1 Usability of the e-Learning platforms

The research used the Software Usability Measurement Inventory (SUMI) as the method for testing the usability of the e-Learning platforms to the users. The usability heuristics looked into using this model is:

i. **Efficiency**: This looked at the students feeling that the platforms are quick and economical.
ii. **Affect:** This looked at the students feeling that the e-Learning platform is stimulating and pleasant.
iii. **Helpfulness**: This looked at the students' perception that the e-Learning platforms are communicating in a helpful way.
iv. **Control:** This looked at the aspect that the platforms are responding in a normal and in a consistent way and assist in the error handling.
v. **Learnability:** This aspect looked at the ease with which the user becomes familiar with the e-Learning platforms and whether there are tutorials.
vi. **Satisfaction:** This aspect looked whether the e-Learning platform are pleasant to use to the students.
vii. **Memorability**: This aspect looked at whether the students can establish proficiency of using the platforms when they return at later period to use the platform.

2.2 Interactivity of the of the e-Learning platforms

This research also looked at the students' interactivity perception of the e-Learning platforms. The interactivity of the e-Learning platforms were measured by availability of these particular parameters.

i. Linear interaction
Listen – Read-Watch.
The learner is passive and reads, listens, watches to the information

ii. **Create – Generate**: Real-time participation
presented through the E-Learning platform

iii. Respond – Practice

Based on the learners actions the feedback is given to the student characterized by discussion forums, real-time communication, real-time simulated games.

3.0 Presentation of Findings

3.1 Frequency of Students' Use of the Moodle e-Learning Platform at JKUAT

Research findings reveal that majority of student fraternity doesn't use the platform and only twenty percent of the students from the Departments of Mathematics and Computer Science use the platform in a regular basis.

3.2 Analysis of usability of Moodle platform according to Jomo Kenyatta University of Agriculture and Technology students

Table 1 below shows the distribution of the findings from the respondents. Moodle scored well in the area of efficiency as students feel that the e-Learning platform is quick in terms of downloading notes as well as economical in the sense that they do not need to photocopy notes from handouts provided by lecturers.

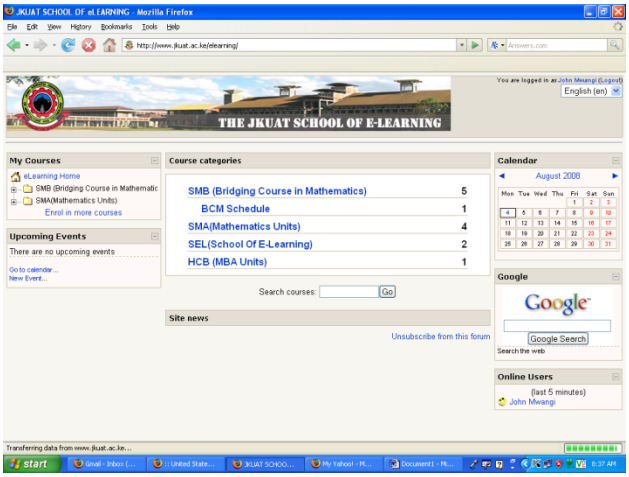
Students who use the Moodle platform argue that most their colleagues are not computer literate so they do not know how to use the facility. This greatly contributed with the fact that Moodle does not have the HELP Menu which can assist novice users learn and navigate the platform. The said factors lead to a low score in the area of helpfulness and learnability.

The students also feel that the Moodle platform is not stimulant and pleasing. The platform is only for notes delivery so they keep away from it. The user control aspect of the platform scores low with the student arguing that the platform does not give them the opportunity to take control of their actions in case that they select components by mistake. The students who use the Moodle generally are not satisfied with the platform as evidenced by a low agreement from the respondents.

Table 1. Usability Perception of Moodle Platform at JKUAT (n=76)

Usability factors	Frequency	Percentage
Efficiency	39	51%
Affect	7	9%
Helpfulness	2	3%
Control	2	3%
Learnability	4	5%
Satisfaction:	6	8%
Memorability	16	21%

Fig. 1 below shows the snapshot of lack of help component on the platform as indicated by the students in the survey.



No help menu

Figure 1. Moodle platform snapshot showing lack of help menu on the platform

3.3 Analysis of the Interactivity of Moodle Platform According to Jomo Kenyatta University of Agriculture and Technology Students

The research asked the students to evaluate the interactivity of Moodle platform. Their responses are shown on Table 2. Students argue that the Moodle platform used at JKUAT is very efficient in content delivery but has a passive aspect to interactivity. The platform scored more in linear interaction (read) (n=76) because it is purely text based. The platform, however, scored very low in linear interaction (listen) (n=0), respond-practice with feedback (n=0) and real time communication (n=0).

Table 2 Frequency Analysis of interactivity perception of Moodle platform at JKUAT

Interactivity factors	**Frequency**	**Percentage**
linear interaction (listen)	0	0%
Linear interaction (read)	76 students	100%
Respond – Practice **with feedback**	0	0%
Forum between students	76	100%
Real time communication	0	0%

The snapshot shown in Figure 2 illustrates the linear interaction without components allowing students to listen and watch. It confirms the concerns of the students that the Moodle platform only offers reading materials and but no listening and watching.

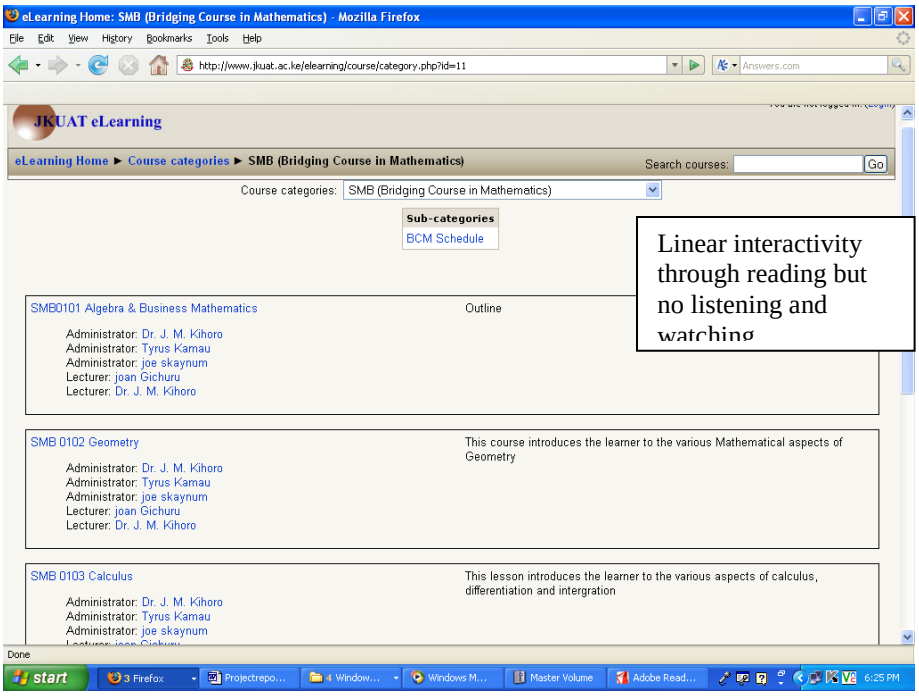


Figure 2. Moodle platform snapshot showing level of interactivity on the platform

3.4 United States International University

3.4.1 Presentation of how often the students use the WebCT e-Learning platform

In the area of usage, WebCT scored high because the e-Learning platform is used in all the faculties in the university as a tool of reaching the students within and without the university. This means that great number of students (70%) do log in to the e-Learning platform to access information. Although there a few number (30%) of students who still do not visit the e-Learning platforms on a regular basis.

3.4.2 Analysis of usability of WebCT platform according to United States international University

Table 3 below shows the distribution of the findings from the respondents. WebCT scored well in the area of efficiency as students feel that the e-Learning platform is quick in terms of downloading notes as well as economical in the sense that they do not need to photocopy notes from handouts provided by lecturers.

Unlike Moodle, WebCT has a help menu but the students feel that it is not offering enough help. This leads to low agreement among students in the area of learnability.

The students also feel that the WebCT platform is not stimulant and pleasing. The platform is only for notes delivery so they keep away from it. The user control aspect of the platform scores low with the student arguing that the platform does not give them the opportunity take control of their actions in case that they select components by mistake. The WebCT platform too didn't score well in the area of satisfaction as a usability aspect since the students do not feel that the platform is meeting their needs.

Table 3. Frequency Analysis of Usability Perception of WebCT Platform at USIU (n=90)

Usability factors	Frequency	Percentage
Efficiency	46	51.1%
Affect	8	8.9%
Helpfulness	9	10%
Control	9	10%
Learnability	5	5.6%
Satisfaction:	5	5.6%
Memorability	8	8.9%

3.4.3 Efficiency in content delivery and assignments download in WebCT

Figure 3 illustrates the efficiency of the WebCT platform as indicated by students from the United States International University. More than fifty percent of students believed that it is efficient.

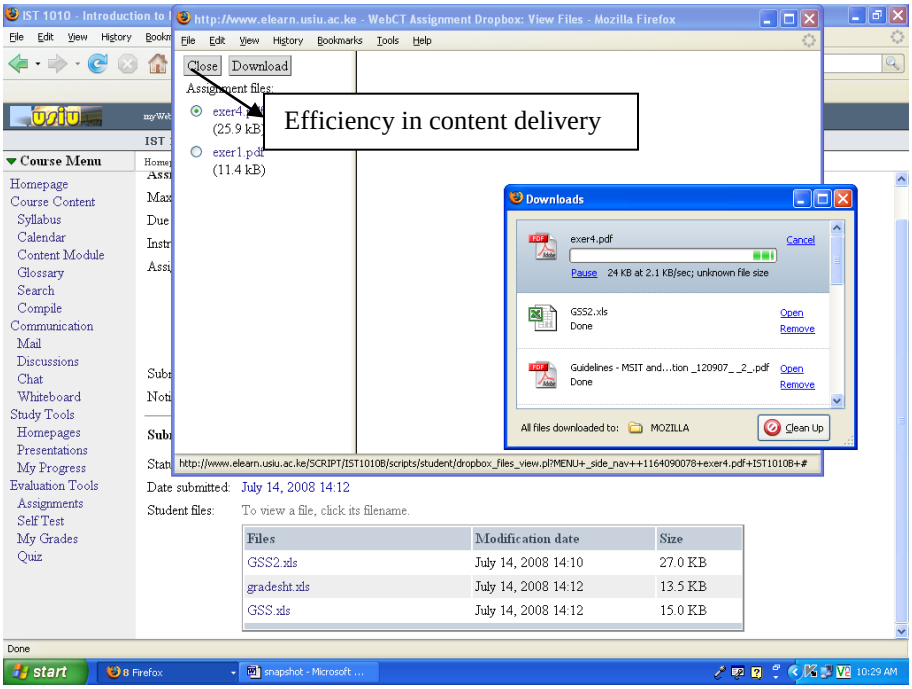


Figure 3. Snapshot of WebCT Showing its efficiency in content delivery

3.4.4 ***Help for using the WebCT platform (students have to browse to look for the help again)***

The students argue that the help menu which is available is not context specific and it is not easy to trace. Figure 4 confirms the difficulty in accessing the help component within the platform.

3.4.5 Analysis of Interactivity of WebCT platform according to United States International University students

The research asked the students to evaluate the interactivity of WebCT platform as shown in Table 4 below. Students argue that the WebCT platform used at USIU is very efficient in content delivery but has a passive aspect to interactivity. The platform scored more in linear interaction (read) (n=90) because it is purely text based. The platform, however, scored very low in linear interaction (listen) (n=0), respond-practice with feedback (n=0) and real time communication (n=0).

Table: 4. Frequency Analysis of Interactivity perception of WebCT platform at USIU

Interactivity factors	**Frequency**	**Percentage**
linear interaction (listen)	0	0%
Linear interaction (read)	90 students	100%
Respond – Practice **with feedback**	0	0%
Forum between students	90 students	100%
Real time communication	0	0%

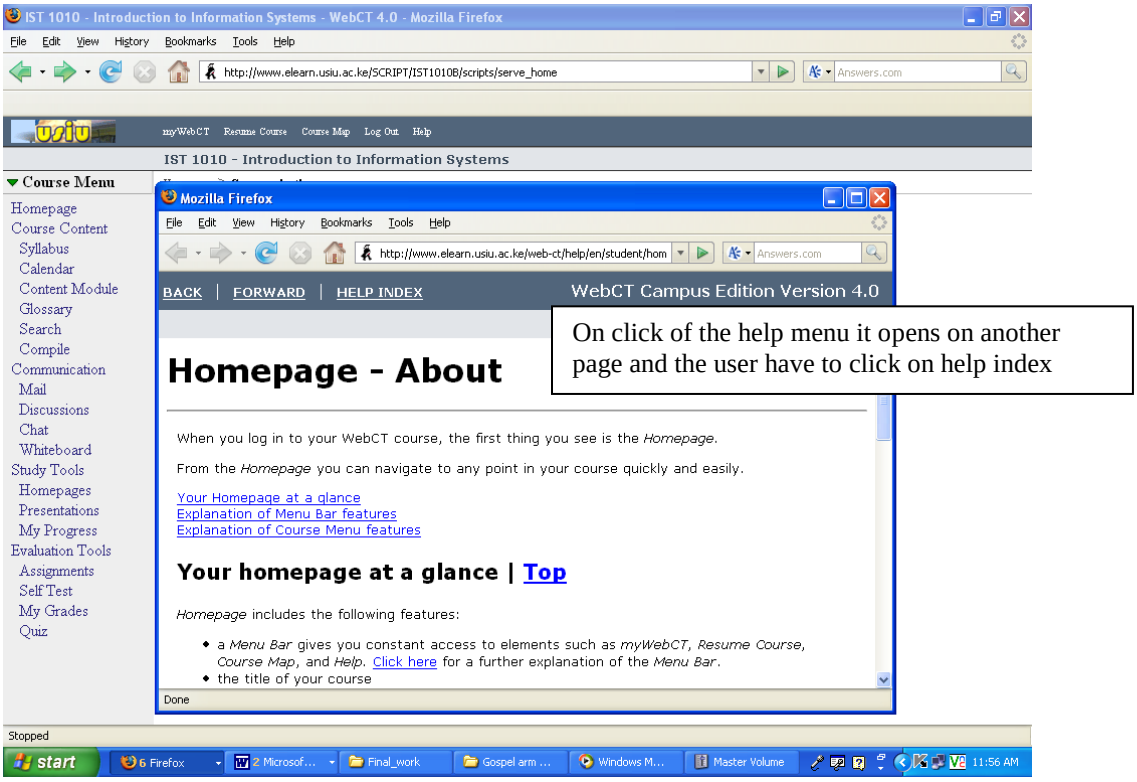


Figure 4. Snapshot of WebCT showing the difficulty in finding help

4.0 Conclusion and Recommendation

4.1 Conclusion

From the evaluation analysis of the students' perception of the two e-Learning platforms Moodle and WebCT, there is no difference as to the perceptions of students in regard to usability and interactivity. The students feel that the e-Learning platforms are not offering enough in the areas of usability and interactivity. The lack of help menus and availability of non-context specific help menu is the cause for the poor score in the areas of learnability, memorability and helpfulness to accomplish the tasks on e-

Learning platform. The passive interactivity on the platforms leads to the poor score in linear interactivity (read) compared to linear interactivity (listen and watch), real-time communication and respond-practice interactivity. Through these findings, it is safe to conclude that the universities have concentrated more on: (1) uploading of notes for students to download and (2) encouraging students to upload their assignments. This level of implementation is inadequate and will not enable the universities to gain much from their technology since the platforms have been left at the level of linear navigation to and from different parts of the platform and for reading materials only.

4.2 Recommendation

4.2.1 The proposed framework

Based on findings and conclusion, a proposed framework puts into consideration the major issues of usability and interactivity. The framework introduces the following components: tool tips, context specific help and user control through the use of message boxes on the structure of the platforms. It is the opinion of the researchers that these will enable the users to find it easy to use the platforms. The framework has also emphasized the need for institutions to include animations, simulation games and video components to shift from the passive interactivity implemented by the institutions.

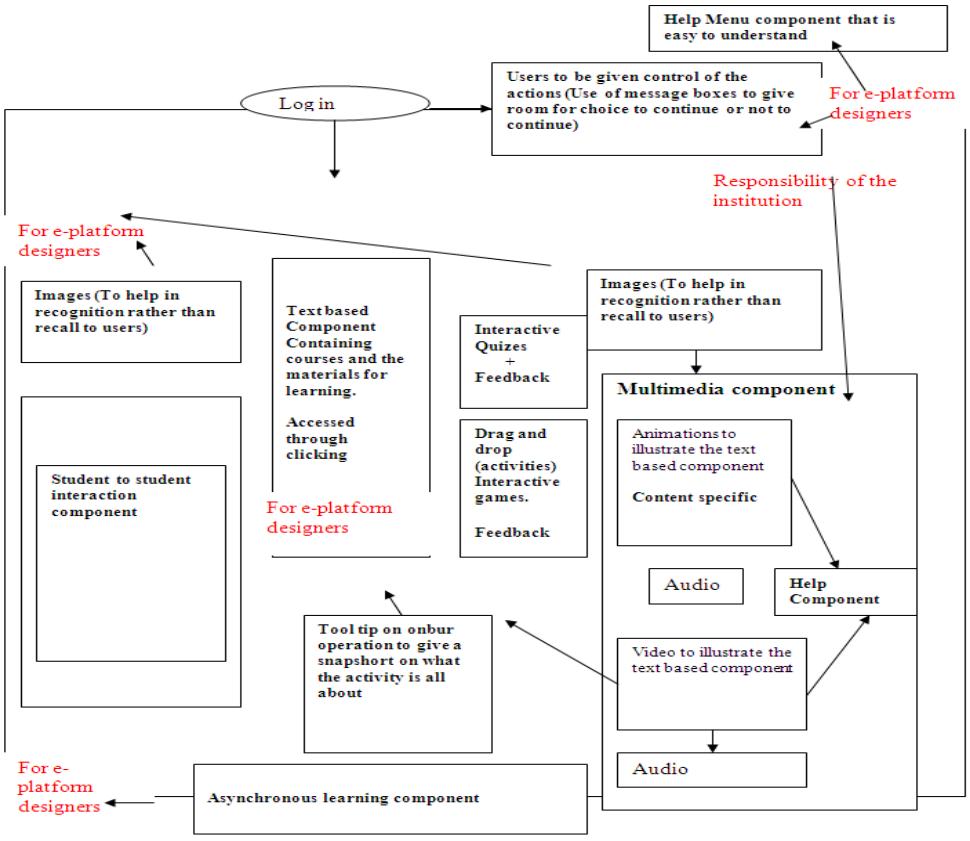


Figure 5. Proposed Framework

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