

Management Information System for E-learning: A Case Study of Federal Polytechnic Bali

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Abstract

This research aims at designing and implementing Management Information System for E-learning that will be dynamic and functional for any academic institution. The methodology used in developing the Website was Extreme Programming (XP) and the adopted approach is object oriented design. The design features of the website consist of some functionality that includes: First of all, the system will allow administrator to add new user (student/lecturer), view and edit record. Secondly, user will be able to login after successful system validation. Thirdly, the system will allow lecturer to upload, download and update learning resources. Fourthly, students will have access to all learning materials and they will be able to perform self-evaluation after reading available learning resources. This self-evaluation is one of the major contributions of the system towards teaching and learning activities. Furthermore, the new system will allow students to search different uploaded learning materials on the websites. In addition to that, only the administrator has the privilege to delete and edit user.

Keywords: learning material/resources, e-learning, Management Information System (MIS), Website, coding, programming and script.

1. Introduction

The world has turned into a global village due to rapid development in technology. Teaching and learning is the backbone of any development and therefore it needs special attention. An E-learning refers to the use of electronic media and information and communication technologies (ICT) in education. The importance of E-learning in any academic institution cannot be overemphasized because it facilitates both teaching and learning activities. Hence, E-learning needs to be managed very well in order to achieve its objectives. For this reason, developing Management Information System (MIS) for E-learning becomes necessary. Management Information System is an organized integration of hardware and hardware technologies, data, process and human elements designed to provide timely, integrated, relevant, accurate and useful information for decision-making purposes. Bidigoli (2010). In practice, the management of any of these entities is quite different, and as such requires the development of distinct technical skills and management strategies depending on the project which is being taken into consideration for building a management information system (Nfor, 2012), quoted (Lucey, 2004).

Effective data management is one of the biggest problems of academic institutions. These data include student records, results, staff records, and library and laboratory equipments. Due to huge records and data redundancy a lot of time and energy resources are wasted in managing them. The Federal Polytechnic Bali, Taraba State Nigeria, is a newly established academic institution and the management wants to take the advantage of adopting an e-learning system for managing academic activities in order to facilitate teaching and learning effectively. For this purpose, I have taken the institution as a case study for developing Management Information System for E-learning.

1. Aims and Objectives

The aim and objective of the research is to design and implement management information system for an e-learning that will be able to achieve the following:

- To facilitate teaching learning activities, eliminate data redundancy, minimize energy and time consumption.
- Large storage, ease retrieval and secure of data.

2. Review of Related Work

Nfor, (2012), analysed that the present system enable users to read and download the current list of solutions and to keep log of learners' hits and attendance (IP addresses used). However, he outlined that the system limited to database storage capacity, search functions and mobile application (such as to allow students to review remotely some concepts even when they are travelling).

Furthermore, Raithore (2012), found that the system he developed was very useful for the users to carry out their everyday task like their timetable and other additional task like viewing feedback which was not present in the existing system. He also noted that, some future will be added such as exam timetable as well as improving the design for the software to look more professional.

Lack of face-to-face contact in virtual learning provides a range of problems for both students and teachers Sanchez et al (2012) quoted Zorrilla et al (2011). Students feel isolated and confused at the hyperspace of course, rapidly losing their motivation in the course and on the other hand, instructors do not have suitable monitoring and tracking tools that help them to know the evolution of students and identify the difficulties they find. E-learning Web Miner (EIWM) Sanchez et al (2012) quoted Zorrilla et al (2011) aims to assist instructors involved in virtual education by extracting and providing useful information that these instructors can use to improve the learning-teaching process. It will also provide a simple and user-friendly interface that hides all the details about data mining techniques to the end user and present the computed results in a user-friendly easily comprehensible way.

Likewise Acimovic et al (2011), mentioned that original web-based e-learning software has been develop and it simulates iterative-incremental process which is carried out during optical design. Yet, an additional task of software is needed to assist the teachers in evaluating student projects. Thus, developers are already working on another prototype that will include the automatic evaluation of student. They suggested that student and teachers will certainly formulate many requirements to expand or improve the software during exploitations.

Due to the weakness of fund shortage and technical difficulties, Management Information System of Universities are affected by different factors, for instance, the form of internal management of universities (all management departments worked independent of each other; the construction process only care about their needs; the lack of unified planning) and many other factors. For the new system, full use of existing unified information platform between heterogeneous business systems was established. Also, unified information platform should be based on the school's overall planning of information resources. Nevertheless, improvement of the traditional management information platform should be in the framework of web services. Liang et al (2010).

Moreover, Forsyth et al (2009), outlined that Virtual worlds are offering increasingly exciting opportunities in terms of potential solutions for many of the issues faced by institutions seeking to implement effective online e-Learning. He added that the virtual world control centre in Second Life has been developed and is currently being evaluated and refined in response to early results. He suggested that an autonomic approach to managing these systems may allow for an improved and more robust performance levels to be maintained which will improve the user experience and therefore adoption of such technologies to a broader learning audience.

Equally, according to Li et al (2008), in a certain period of time, the traditional resource management system met the requirements of the learners and the resource system administrators, however, when the demands change, it is necessary to expand the existing systems' operational function, the traditional resource management system cannot make this quick response, so we can only rely on the systems development staff to update the original application, or evenly the whole system should be redone. And the same pattern of resource management systems repetitive developments will inevitably cause human and material waste. They provided solution in the new system whereby users can search the registered information about the educational resources; the system can response quickly to request from users, the administrators and users can manage system and search about their need sources on the internet. The system also, allows administrators to finish the educational resource registration, system's daily management and final it can help users rapidly escalate and still in the hand-drawn stage, we need for the further improvements.

Additionally, Management Information System must be effectively developed and use of communication system to encourage relationship between information system staff users, customers and suppliers. Keown (2008).

3.1 Selected Technologies

Base on the above review and critiques of the existing systems, there are lot of vacuum left and need to be bridged up in order to achieve successful design and implementation of management information system for e-learning platforms. In order to achieve successful dynamic and functional E-learning website, object oriented programming design approach will be adopted. The web architecture will be based on JSP (Java Serer Pages) model because it can be implemented on any platform. (Advantage and Disadvantage of JSP, 2013)

Also, PHP script, and HTML will be used for coding and designing the website respectively because they are free source code, easy, simple to learn and implement. Furthermore, MYSQL database will be used in connecting the WebPages and is cost effective, cross platform operability and secure.

3. Use Case

According to Whitten, J. L. Et al. (2001), use case is a behavioural related sequence of steps (scenario), both automated and manual, for the purpose of completing a single task. Similarly, use case refers to a collection of related sources and failure scenarios that describe an actor using system to support a goal. Larman, (2005). Use cases are defined to satisfy the goals of the primary actors. He further outlined the guideline on how to find use cases:

S/N	Actors	Possible Use case	Goal Description
1	System Administrator	i. Update ii. Delete iii. Add	i. Update Updating learning materials ii. Delete Deleting learning materials iii. Add Adding learning materials
2	Students	i. Read/View ii. Search iii. Download iv. Evaluation	i. Read/View Enable students viewing any relevant learning materials ii. Searching Enable student to search for learning materials iii. Download Enable students to download available learning materials iv. Evaluation Enable learners to evaluate themselves after self-study
3	Lecturer	i. Upload ii. Delete iii. Update	i. Upload Uploading learning resources to the website. ii. Delete Deleting learning resources from the website. iii. Update Updating learning resources from the website.

Table 1: Actors/Users of the Website

4. Use Case Diagram

Use case diagram refers to a graph that graphically depicts the interactions between the systems and users. In other words, it graphically describes who will use the system and in what ways the user expect to interact with the system. Whitten, J. L. Et al. (2001). The figure bellow shows the use case diagram of the new system.

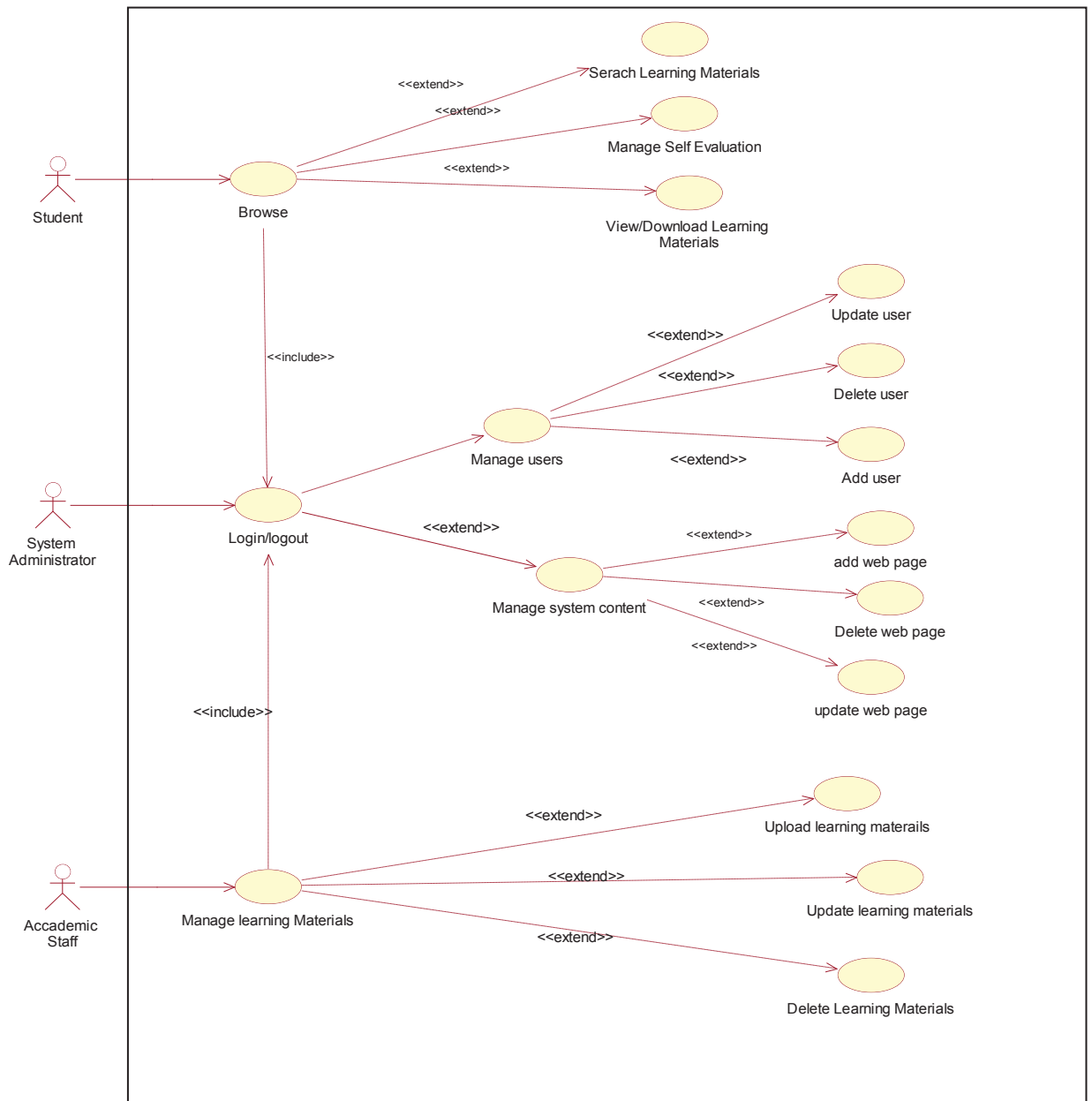


Figure 1: Use Case Diagram for the New System

5. Class Diagram

Class diagram is structural diagram that shows the static structure of an object oriented model i.e. the object class, their internal structure, and the relationship in which they participate. Hoffer et al (2002). The purpose of a class diagram is to depict the classes within a model. In an object oriented application, classes have attributes (member variables), operations (member functions) and relationship with other classes.

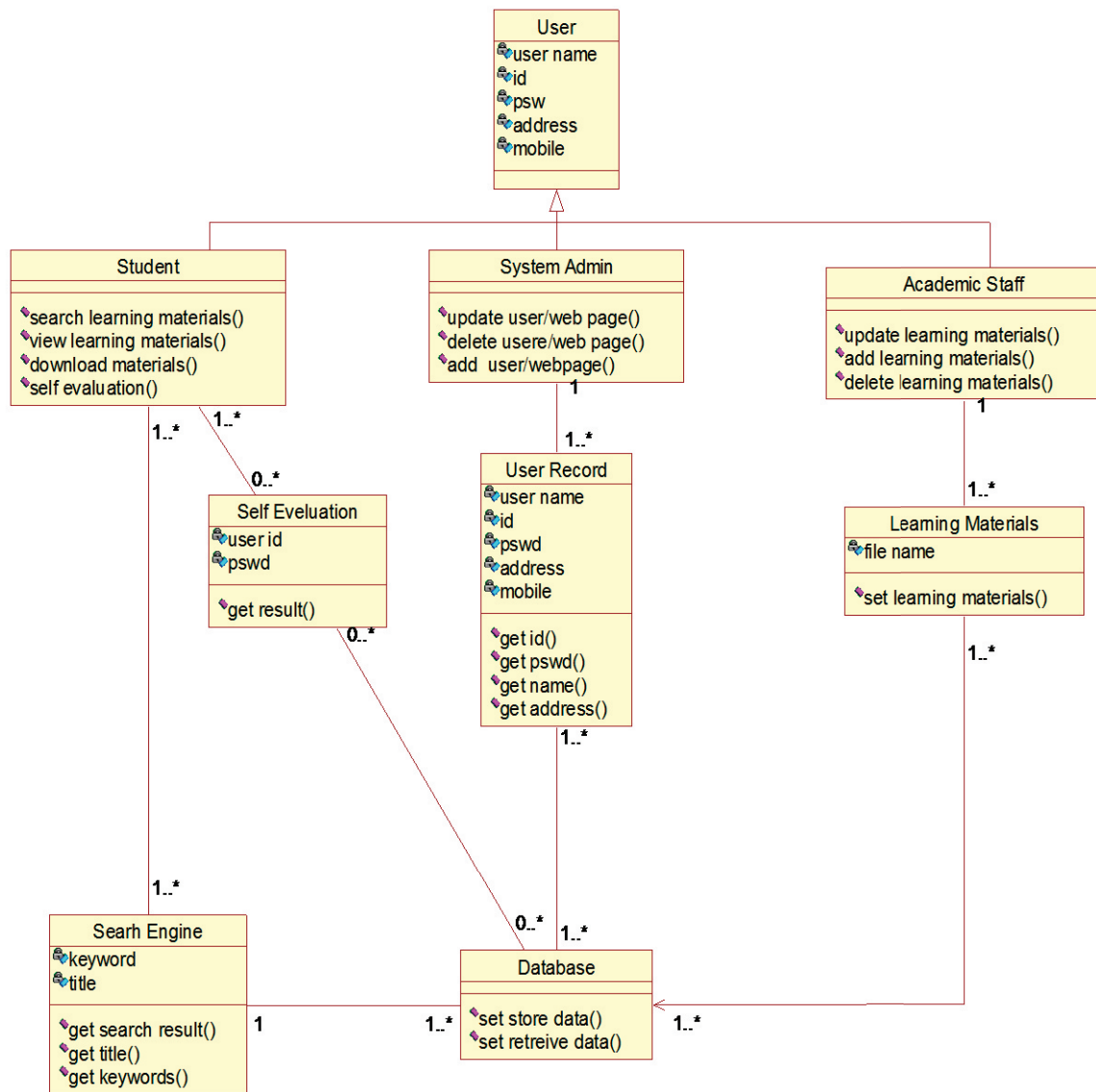


Figure 2: Class Diagram for the New System

6. Sequence Diagram

Sequence diagram illustrates the interaction among objects during a certain period of time. Hoffer et al (2002). During this design the functionality of sequence diagram were maximally explored and applied for effective and successful system development.

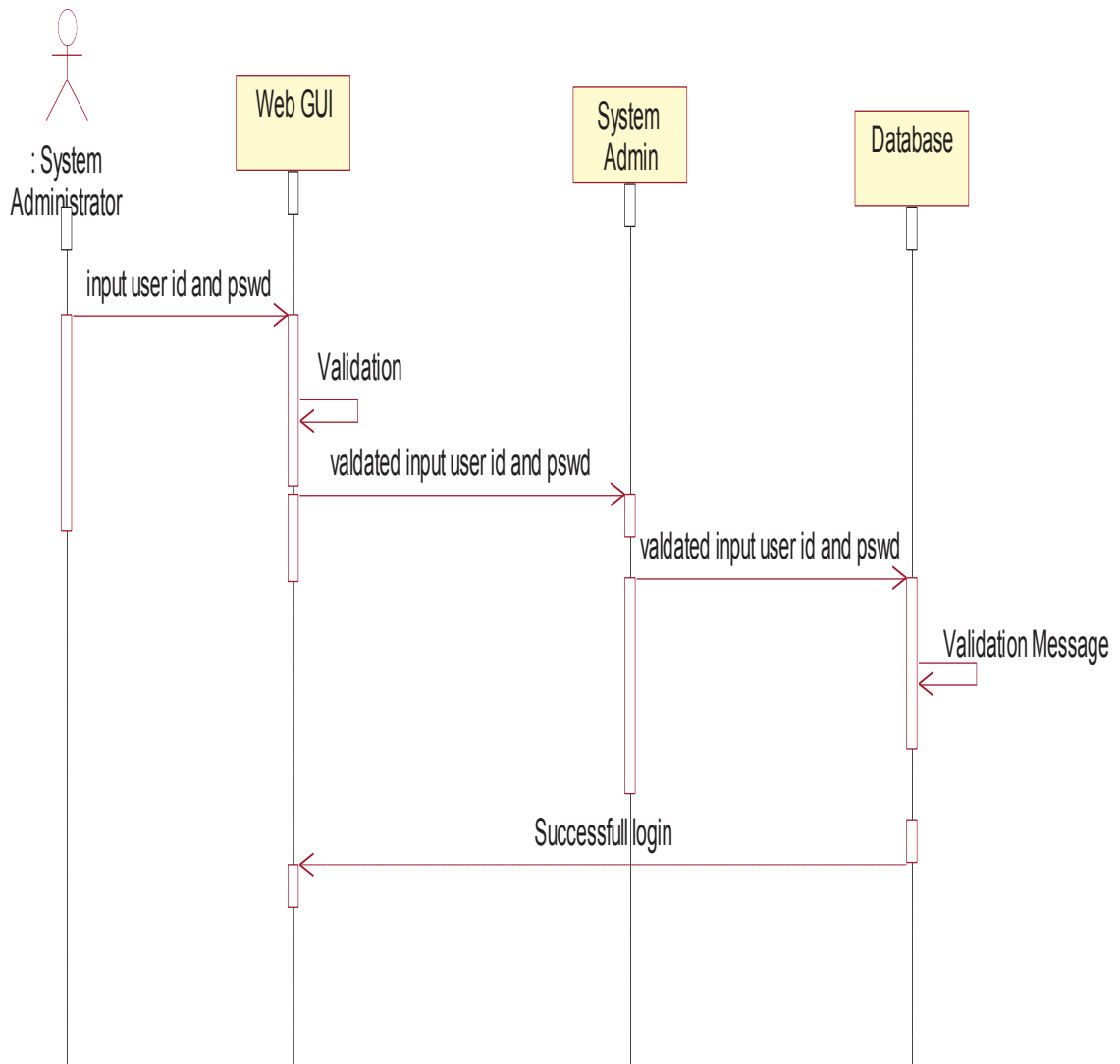


Figure 3 Sequence Diagram for Login

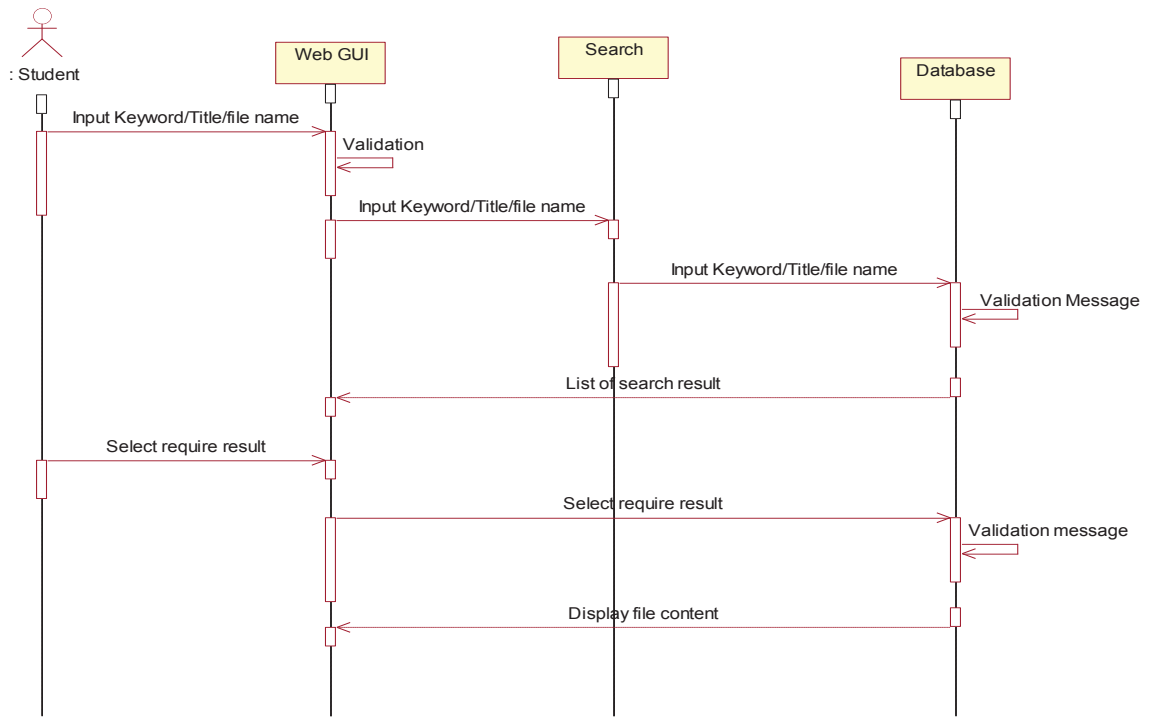


Figure 4 Sequence Diagram for Search

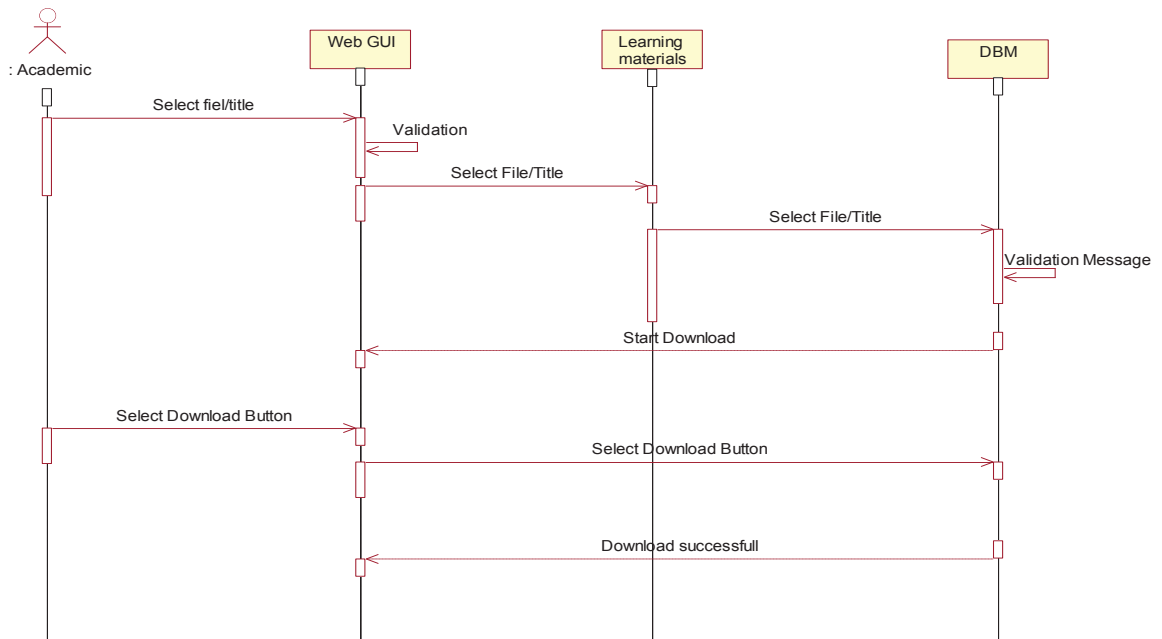


Figure 5 Sequence Diagram for Download

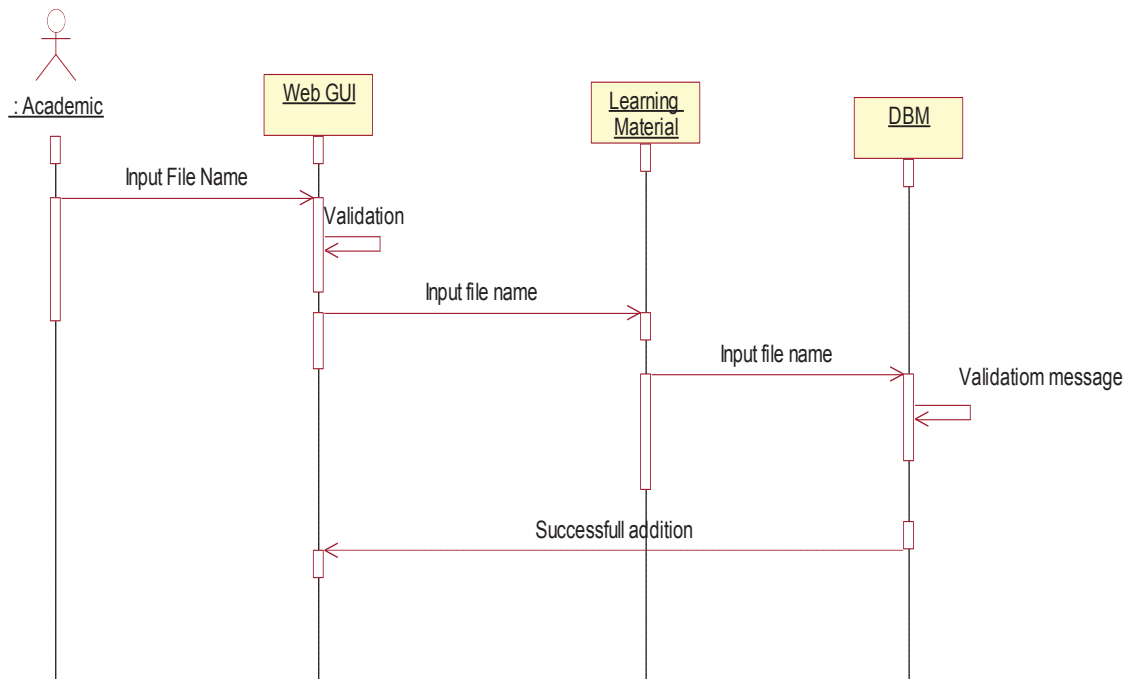


Figure 6 Sequence Diagram for Adding Learning Materials

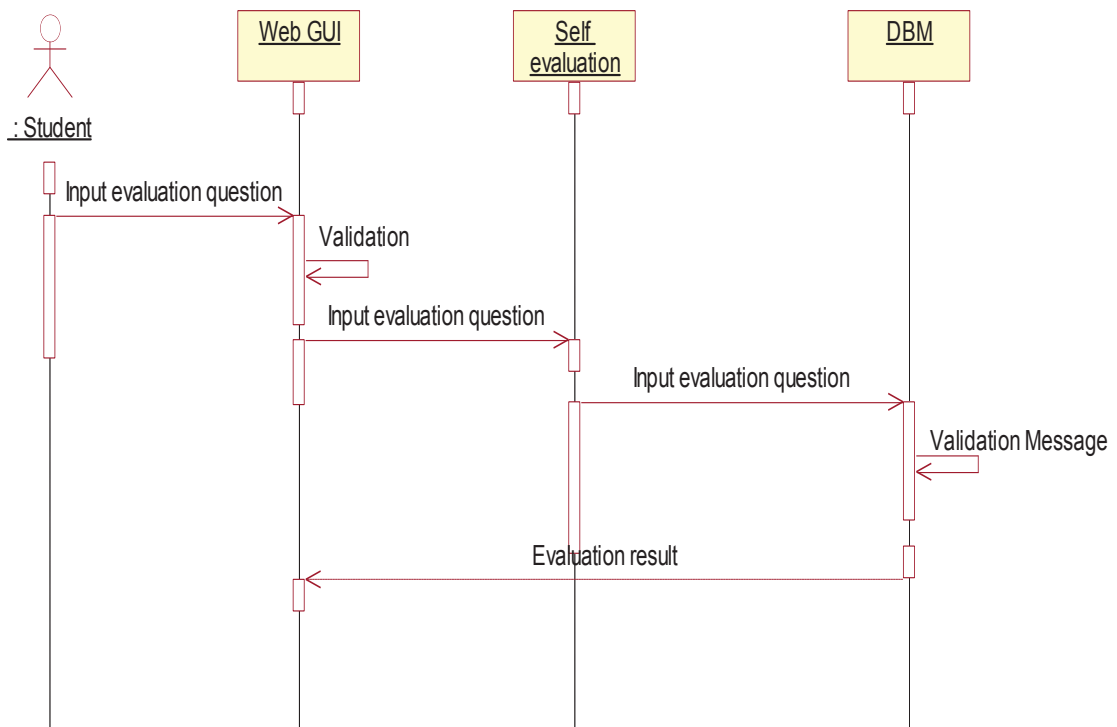


Figure 7 Sequence Diagram for Self Evaluation

7. Conclusion

During the process of design and implementation of Management Information System for E-learning, features such as user registration and Login, edit and delete records, upload/download files and student self-evaluation were successfully achieved in the design stage. The design was tested at the stage of implementation and user can login, register, view records and perform self-evaluation successfully.

8. Further work

Research is a continue process and human being always need a simplify life for day to day activities therefore, there is a need to in-cooperate features like edit records, upload/download files and search functionalities as earlier outlined in the design in order to make the website complete. Other features can be added such as:

- ❖ Result processing
- ❖ Transcript processing
- ❖ SMS
- ❖ Video conference
- ❖ Access to journals
- ❖ Access to library etc.

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