LMS

Learning Management System

BRD

Introduced by G13

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Introduction

Executive Summary

LMS learning management system is a software application for the administration, documentation, tracking, reporting and delivery of educational courses or training programs or learning and development programs. The learning management system concept emerged directly from e-Learning. The system offers sign up for students and teacher. LMS offer students track their grades, attendance, assignments, course materials and offer online delivery of their assignments and communication with their instructors. LMS also offers to instructors to introduce their material, assign students to their class, put tasks and assignments, update their attendance, grades and make analysis on it, take reports and feedback about their progress.

Document Overview

This document introduces Learning Management System product study plan. It introduces general description, development cycle, operation plan, working system, cost analysis and marketing plan.

Business Objectives

- Login/Authentication/Sign Up Module
- Insert/Update/Delete Module to Students and Teachers profiles.
- Attendance Module.
- Assignments handle Module.
- Time Table Module.
- Student Analytic Module.
- File management.

Background

Introduction[1]

LMS A learning management system is a software application for the administration, documentation, tracking, reporting and delivery of educational courses or training programs or learning and development programs. The learning management system concept emerged directly from e-Learning. Although the first LMS appeared in the higher education sector, the majority of the LMSs today focus on the corporate market. Learning Management Systems make up the largest segment of the learning system market.

Learning management systems were designed to identify training and learning gaps, utilizing analytical data and reporting. LMSs are focused on online learning delivery but support a range of uses, acting as a platform for online content, including courses, both asynchronous based and synchronous based. An LMS may offer classroom management for instructor-led training or a flipped classroom, used in higher education, but not in the corporate space.

Through LMS, teachers may create and integrate course materials, articulate learning goals, align content and assessments, track studying progress, and create customized test for students. LMS allows the communication of learning objectives and organize learning timelines. LMS leverage is that it delivers learning content and tools straight to learners, and it can also reach marginalized groups through special settings. Such systems have built in customizable features including assessment and tracking. Thus, learners can see in real time their progress and instructors can monitor and communicate the effectiveness of learning. Such systems have built in customizable features including assessment and tracking. Thus, learners can see in real time their progress and instructors can monitor and communicate the effectiveness of learning. One of the most important features of LMS is trying to create a streamline communication between learners and instructors. Such systems, besides facilitating online learning, tracking learning progress, providing digital learning tools, manage communication, and maybe selling content, may be used to provide different communication features.

[1] https://en.wikipedia.org/wiki/Learning_management_system

Survey[2]

Why do university schools need Student Information System?

Martin (1992) rightly says that “it is probably true that many of today’ s business simply could not function effectively without automated information processing systems of some form or another, so do university schools. All of them have common tasks such as collecting, storing and processing information regarding their students, staff and the work done within the department. With the increase of information, it is unwise to adopting the traditional paper-based system which is slow to access and therefore, inefficient. Recent years, many systems were developed either by the universities or the software companies to partially automate many of the processes carried out by the department.” Those developments dramatically reduce the time take in searching information and should enable the school to maintain precise and up-to-date information. For example, previously, students would have to enquire for much of his information from the school student office, which required more time and effort, particularly from members of staff. The new system is more efficient and often presents more accurate information. However, those systems vary even within the same university. Some are quite well developed and implemented, some still adopting the inferior and out-of-date technology. This is also one of the project’s aims: to analysis some sample systems to attain the strengths and eliminate the weaknesses in developing the new potential student information system.

The first known document of correspondence teaching dates back to 1723, through the advertisement in the Boston Gazette of Caleb Phillips, professor of shorthand, offering teaching materials and tutorials. The first testimony of a bi-directional communication organized correspondence course comes from England, in 1840, when Isaac Pitman initiated a short hand course, where in he sent a passage of the Bible to students and these would send it back in full transcription. The success of the course resulted in the foundation of the phonographic correspondence society in 1843. The pioneering milestone in distance language teaching starts in 1856 by Charles Toussaint and Gustav Langenscheidt, who started up the first European institution of distance learning. This is the first known instance of the use of materials for independent language study. Correspondence institutions in the United States and across Europe were encouraged and fostered by the development in 1680 of the penny post service, which allowed the delivery of letters and parcels for a penny.

The concept of eLearning began developing in the early 20th century, marked by the appearance of audio-video communication systems used for remote teaching. In 1909, E.M. Forster published his story 'The Machine Stops' and explained the benefits of using audio communication to deliver lectures to remote audiences.

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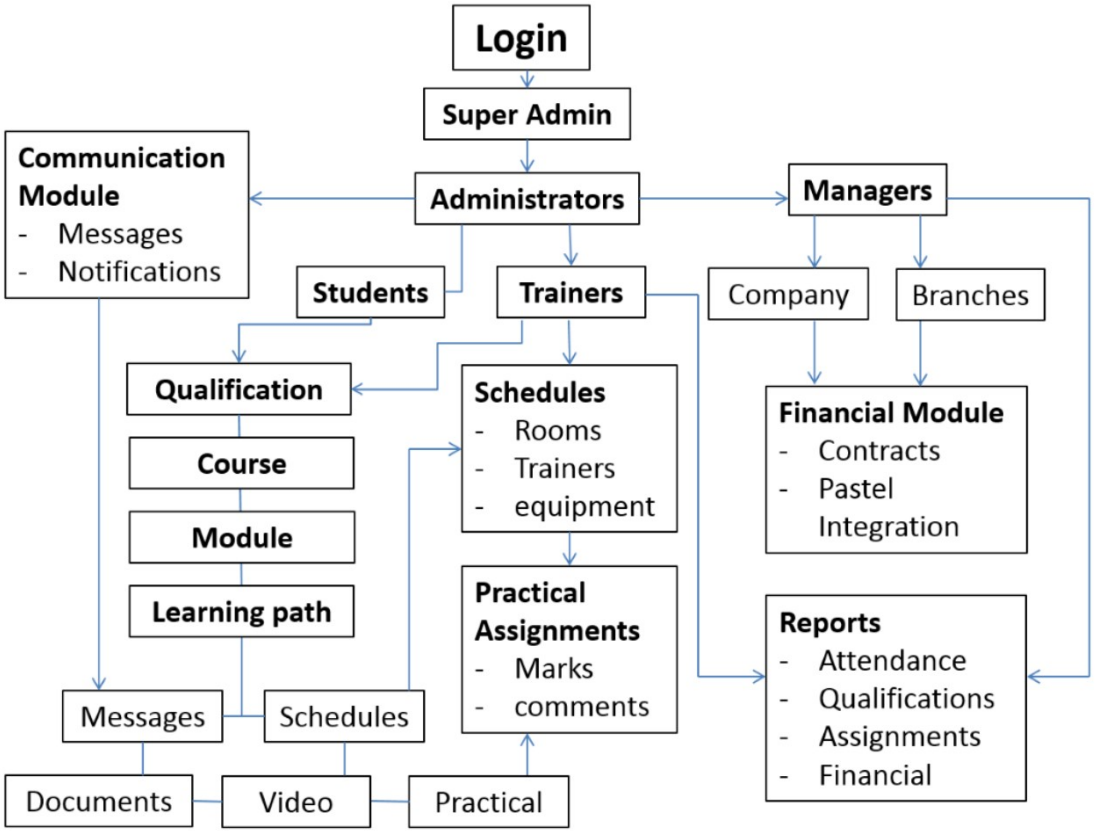
[2] https://en.wikipedia.org/wiki/Learning_management_system

Here the term "multimedia" refers to the use of several means (media) to reach the students and provide instruction. Printed materials are joined by audiotapes, videotapes, radio and TV, broadcasts, telephone, etc. The earliest networked learning system was the Plato Learning Management system (PLM) developed in the 1970s by Control Data Corporation. In 1920, Sidney L. Pressey developed the first teaching machine which offered multiple types of practical exercises and question formats. Nine years later, University of Alberta's Professor M.E. Zerte transformed this machine into a problem cylinder able to compare problems and solutions.

Project main functions:



Login/authentication module

Each student/supervisor must sign up to have only one account on the LMS website, so each student can follow up the courses and the functions that the LMS provides the students with.

The e-mails, user names, passwords are secured so that no one can access other student's data, only the supervisors can access the e-mail of the students, so they can use it to contact with the students if needed.

General User Area

The general user area is the first page after the student/supervisor can access after logging in the website, this area is available for 2 different styles, the first one is for the student, at the student's general user area the student can access other pages like the attendance module page, the assignment handle module page and the timetable module page, as for the supervisor it's a slightly different, the supervisor can access the same pages but the differences are that for example in the attendance module the supervisor can edit and enter data to the page but the student can't.

Generally, this module provides user with main system activities like accessing the attendance module, accessing the assignment module, pursuing his grades and the time tables.

In online exams, users can view results after examiner approval. Users can view examination history and achieved results.

In additions, users can browse and find courses topics also, users can edit their profiles and view other user's profiles.

General system support martial are published to help users. However, users can communication with system operators to report issues or to get a direct support.

Insert/update/delete module to students and teachers' profiles

Each student /supervisor can enter their profile after signing in to the LMS website, and for the students they can insert a profile picture, upload the assignments, update his information's like the address.

For the supervisors, they can enter their profiles and do the same things as the students, but they have extra features like updating the assignment and the course's contents, the can add/delete any books or references to the benefits of the students and to produce better courses and contents.

Attendance module

The Attendance activity allows teachers to maintain a record of attendance, replacing or supplementing a paper-based attendance register. It is primarily used in blended-learning environments where students are required to attend classes, labs and tutorials and allows the teacher to track and optionally provide a grade for the student's attendance. The instructor can set the frequency of their classes (# of days per week & length of course) or create specific sessions.

To take attendance, the instructor clicks on the "Update Attendance" button and is presented with a list of all the students in that course, along with configurable options and comments. The default options provided are: Present, Absent, Late

& Excused. Instructors can download the attendance for their course in Excel format or text format.

Sessions can also be configured to allow students to record their own attendance and a range of different reports are available.

if there any problem the students can communicate with the admins to report the problem. The system can save this data so at the end of semester it can be added to the total marks calculate the student's degree.

Assignments handle module

The assignment activity provides a space into which students can submit work for teachers to grade and give feedback on. This saves on paper and is more efficient than email. It can also be used to remind students of 'real-world' assignments they need to complete offline, such as art work, and thus not require any digital content.

Student submissions are together on one screen of your course. You can require them to submit one or several files and/or to type text essays. It is possible to have them submit work as a group and you can also choose as a teacher to grade their work 'blind' in other words not to see the identities of those who have submitted assignments. Assignments can have deadlines and cut off dates - which you can also extend if necessary.

Assignment (Submission) types:

Students can type directly into LMS website, upload files or add media.

Online text: Text typed into the auto editor is automatically saved and the teacher can set a Word limit which will display a warning if students exceed it.

File submissions: Students can upload files of any type the teacher specifies. The teacher can specify the maximum number of files which may be uploaded and a maximum size for each file.

Students may be able to add a note (comment) to their teacher when the submit their work.

Feedback types: Teachers may give feedback in various ways.

Students may upload documents such as .docx, PDF and the teacher can annotate directly on the student's submission (requires Google Drive converter to be installed by an admin).

With online text submissions, the student's submission will appear in the feedback comments box (if enabled) so teachers can annotate on it and add their feedback comments in the same area.

Feedback comments: allows graders to leave comments about the students' submissions as well as grades.

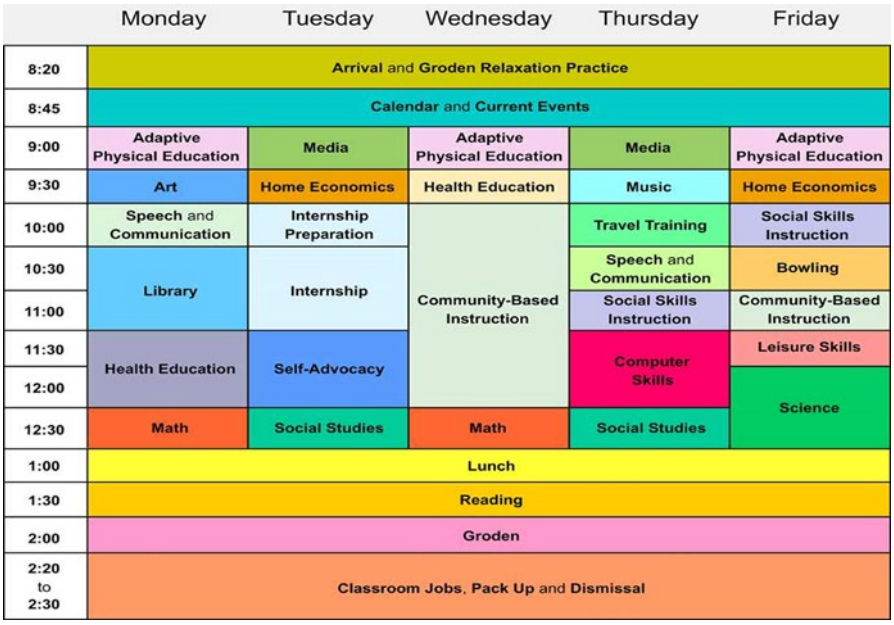
Offline grading worksheet gives the teacher a link to download the grading list as a spreadsheet. They will then be able to enter grades and feedback comments offline and then re-upload the sheet.

Feedback files allows graders to upload files with feedback when marking. These files may be the marked-up student assignments, documents with comments, a completed marking guide, or spoken audio feedback.

Timetable module

The Timetable Module is a comprehensive creation, planning and staff cover tool, able to manage down to individual student, staff member and room level.

Timetable can be used in manual (standard) and automatic (optional) modes and handle multiple timetables.



- Option for one-week or two-week timetables.
- Manual (standard) or automatic (optional) timetable creation using pre-defined parameters.
- Full integration with the Staff and Attendance Modules as well as the online Portals.
- Setting of individual timetable parameters for each year group.
- Creation of multiple timetables for each year group.
- Individual student timetable printouts.
- Period locking - ideal for registration times or fixed tutorial sessions.
- Easy location of staff and students by using the staff and student finder function.

- Flexible staff planning by allocating preferred periods and identifying part-time staff.
- Ability to manage Staff Cover and identify available teachers.
- Timetable print options in formats suitable for form rooms, staff rooms or school notice boards.

Student analytic module

Student analytic module is responsible for doing some mathematical function on student's grades.

For each student it is responsible for calculating the GPA, and all student it is responsible to classifying the students based on the aspherical order in the student's name-sheet, calculating the maximum, the average grades, and classifying all the students ranks based on their degrees.

System Description:

What is LMS System

LMS System deals with all kind of student details, academic related reports, college details, department details, exam mark details, section details and graph details too. It tracks all the details of a student from the day one to the end of his course which can be used for all reporting purpose, tracking of attendance, mark details, percentage calculations, completed semesters years, exam details, cycle test1, cycle test2, cycle test3, model exam, university result etc. To maintain the information of students (Attendance, personal and academics) To generate the reports in various ways (pdf, excel). To made retrieval of data easier.

Features

Main project functions

- This system can be divided in two parts.
    - Teacher part that can be access by Teachers.
    - Student part that can be access by the students.

1. Login/Authentication Module
2. Insert/Update/Delete Module to Students and Teachers profiles.
3. Attendance Module.
4. Assignments handle Module.
5. Time Table Module.
6. Student Analytic Module.
7. File management.

Additional functions

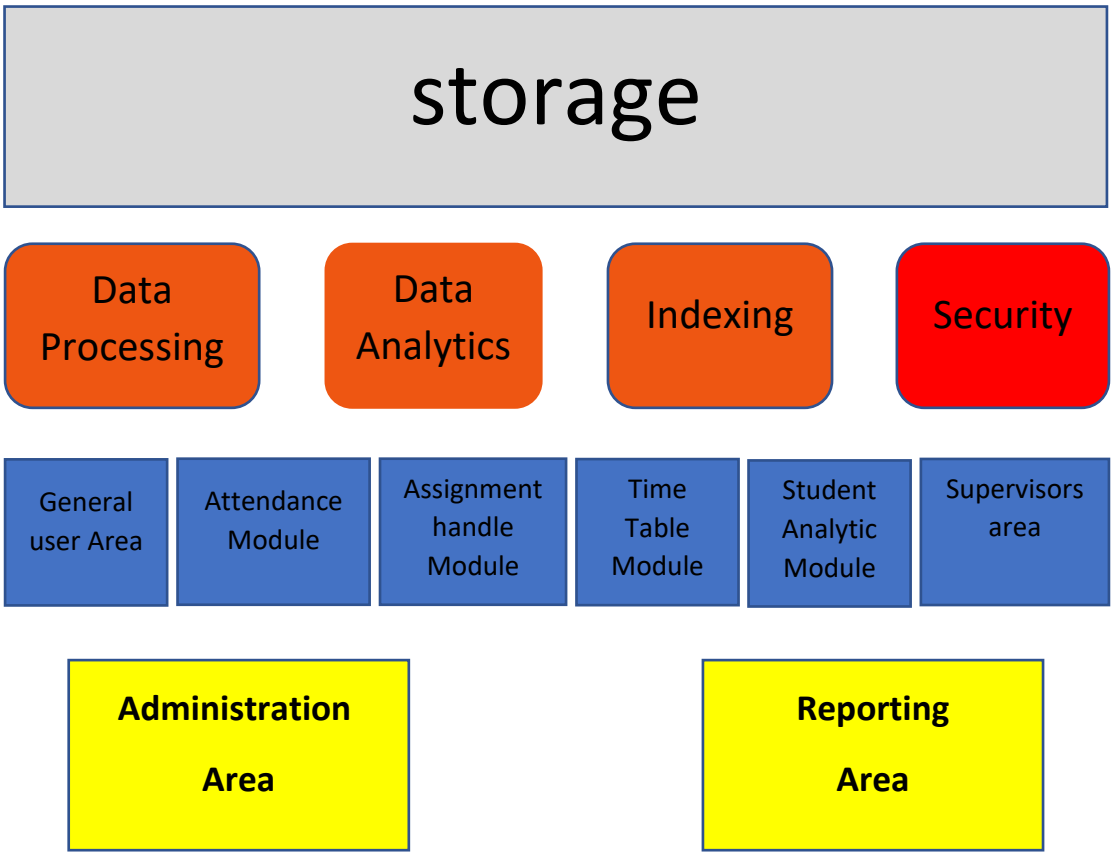
- Person Chat.
- Group Chat.
- Email Contact.
- Report Generation.
- Online Quizzes.

System Architecture

LMS system introduces details of everything in the certain course which contains the details of exams marks, graph, academic reports, department and section .The system offer the contents and service to desktop users via web-based using web from using PC , laptop and mobile.

The system consists of following modules:

(1) Storage, (2) Data Processing, (3) Data Analytics, (4) Indexing, (5) Security, (6) General User Area, (7) Attendance Module, (8) Assignment handle Module, (9) Time Table Module, (10) Student Analytic Module, (11) System Administration Area, (12) Security, (13) Reporting Area, (14) Cloud Service.



Storage

LMS uses different types of storage:

- Core storage for student modules and user interaction
- Core storage for education materials and time table module
- Archive storage for historical changes, deleted contents and old logs
- System storage for system configuration, user's information and fresh logs
- Indexing storage to support full text search engines
- Analytics storage(s) to store the outcomes of data analytics module

Core storage uses NOSQL unstructured database installed over distributed infrastructure. Unstructured scheme allows flexible data definition and allow future extension of question types. NOSQL database speed up the queries compared with raw data storage format. Cloud infrastructure offer high availability and instant recovery of data.

Archive storage uses JSON data format stored directly over distributed storage. JSON allow flexible access of data attributes. Distributed storage allows fast access of data items and offer expandable storage. Data replication is configured to minimum which full data availability and data recovery needs of archiving information.

System storage uses traditional structured database which provide better queries and data processing over structured contents.

Data Processing

Data processing module is responsible on providing all data related services like data modeling, data transformation, data classifier and multimedia processing.

Data modeling is required to understand the textual material based on the related language model, this will allow better revision and improve the quality of education information. Data transformation is required to allow import and export of different data format. The system supports common data formats supported by common data processors applications. Multimedia processing is required to enhance the quality of multimedia contents like images, audio and video. It converts multimedia contents to unified format. Also, this service is required to detect some features required by data classifier service. Data classifier is required to classify the contents which is important to avoid non-appropriate material. The classifier uses information retrieved by data modeling and image and video processing services.

Data Analytics

LMS System holds huge amount of contents which includes students information, user interaction and logs, Attendance Module, Time Table Module, Student Analytic Module and assignments module. This module is important to study the contents and produce very useful result. Basically, this module support following data analytics.

Similarity analysis to determine similar examination contents. This analysis is important to avoid generating exams having similar questions.

Quality analysis to study the correctness of examination contents based on user interaction. High quality contents will be published to all users. Low quality questions are used only by their authors and related users. Security analysis to study user behavior to avoid future attacks. Basically, this analysis users logs to study user behavior.

Statistical analysis to produce a set of statistical studies regarding contents and user's interaction. For example, this analysis can study the distribution of student information contents vs. time or region or language

Indexing

This module is responsible on indexing textual contents to allow internal full text search queries. Full text search is used by final users to find certain contents. Also, it used by other modules like data processing to locate contents in a fixed time regardless the overall contents size.

Security

Security module is responsible on user authentication and communications security. User can register/login using internal accounts or via their phones or common social accounts. The portal access is made using https protocol in order to secure the communication.

Security module also responsible on managing the permissions and roles. Users are either guests, logged users, school books authority owners, supervisors.

Security module also, responsible on detecting the threats and preventing data theft. The system is tested against common attacks using known penetration testing tools. Data theft is prevented using various data protection techniques as described in "IMS Process Security" feature.

General User Area

This module provides user with main system activities like accessing the attendance module, accessing the assignment module, pursuing his grades and the time tables.

In online exams, users can view results after examiner approval. Users can view examination history and achieved results.

In additions, users can browse and find courses topics also, users can edit their profiles and view other user's profiles.

General system support martial are published to help users. However, users can communication with system operators to report issues or to get a direct support.

Attendance Module

Instructors and teaching assistants can use the Attendance activity to record student attendance. Each mark (e.g., Present, Late, Excused, Absent) is assigned a point value, and the aggregate score for each student appears in a single column in the LMS gradebook. Students can also view their own attendance record and any instructor comments in the Attendance activity itself.

Assignment handle module

The assignment module allows teachers to collect work from students, review it and provide feedback including grades. The work students submit is visible only to the teacher and not to the other students unless a group assignment is selected.

Students can submit any digital content (files), including, for example, word-processed documents, spreadsheets, images, audio and video clips. Assignments don't necessarily have to consist of file uploads. Alternatively, teachers can ask students to type directly into a text field in the website. Or they can ask student to do both, upload a file or files and type text directly into the website. An assignment activity can also be set up to not accept any student submissions and serve as a reminder to students of a 'real-world' assignment they need to complete and to record grades in Moodle for activities that don't have an online component.

An assignment has an 'available from' date before which no students can submit anything, and a due date, after which teachers can choose not to accept submissions any more.

Markers can choose to be notified every time a student submits an assignment, or only for late submissions. Markers can choose to give students feedback in the form of text or uploaded files.

This module let the students to know the assignment required to deliver and the deadline of those assignments, students can upload those assignment and know their grades after supervisors check them,

Time table module

Timetable Generation is one of the most complicated and time-consuming tasks for every school/ institution as each class has a unique time table with specified subjects and teachers. This Timetable Software generate teachers time schedule easily and quickly. This software provides best solution in creation of timetable in a very simple way and avoids time conflicts in adjustments.

- option for one-week or two-week timetables.
- Manual (standard) or automatic (optional) timetable creation using pre-defined parameters.
- Full integration with the Staff and Attendance Modules as well as the online Portals.
- Setting of individual timetable parameters for each year group.
- Creation of multiple timetables for each year group.
- Individual student timetable printouts.
- Period locking - ideal for registration times or fixed tutorial sessions.
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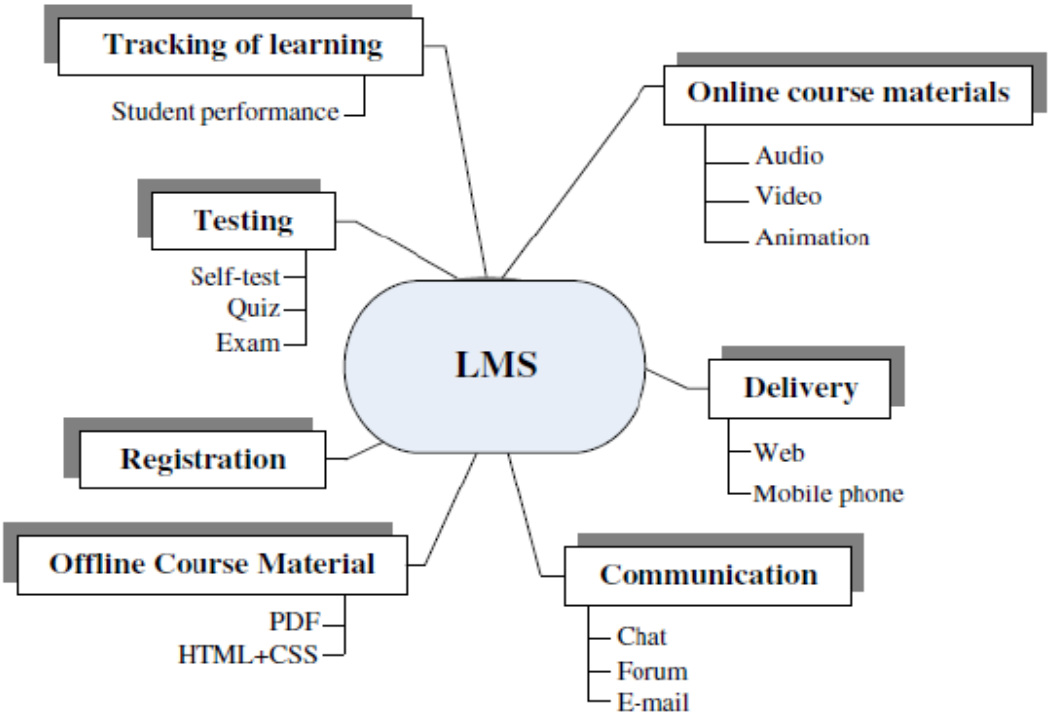
Supervisors area

This module is dedicated for system operators. System operators are responsible on managing the system operation and contents. System operators, can access all system contents, view statistical reports, and provide direct support to users.

System Administration Area

This module is dedicated for system administrators. System administrators responsible on system management, configuration, backup and solving technical issues. System administrator can view system status, data status, online sessions, logs and other system status and measures.

System Features



User Management

- the system is divided into two parts one can accessed by Teaching staff and the other can be accessed by students.
- Users must register to use the site.
- Users can edit their profile easily and change their personal information like his profile photo, location, emails, address, nickname (his real name will be set by the university), and his phone number; all of this to get a quick access to the user.
- Teaching staff can add students to their course board and send invitations to them.
- Teaching staff can request additional identification from participants like student id or employee id.

User Functions

this area is available for 2 different styles.

student:

- student can access his courses and related materials.
- student can access his attendance and grades.
- student can access his assignments and submit.
- student can access his timetable.

Teacher:

- Teacher can access his courses and related materials.
- Teacher can access the course attendance and edit it.
- Teacher can access the course assignments and make one.
- Teacher can put the course timetable.
- Teacher can view his students' grades and analysis them.

Student Analytic Module

- The system evaluates student activities.
- The students may refer to their evaluation records as a reference in their resumes.
- Organizations and companies may consider those records in the future.

Feedback

Teaching staff can send a report file to every student in the course about his ratings during course, performance, marks, and without sharing the information with other students; to help the students to know their level and progress rate.

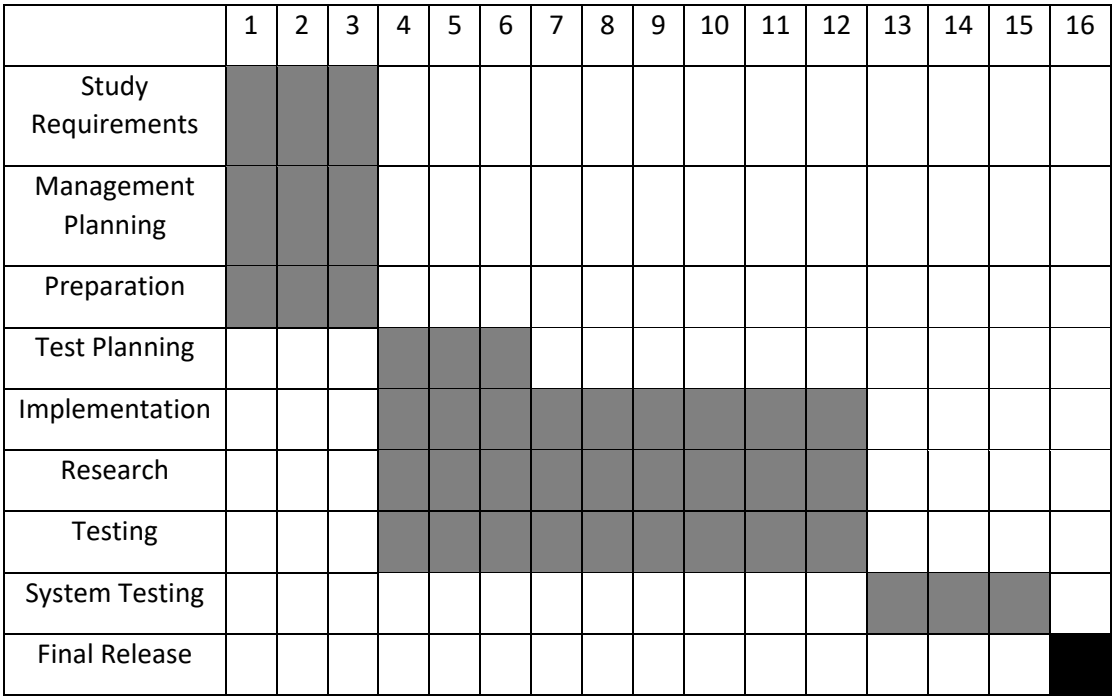
System development and operation

Overview

This system development is performed using a mix of Agile and Waterfall methodology. Initial R&D activity should be applied to experiments tools and techniques. Later continuous R&D activity will run beside the system development activities. The first version of the system should take 3 months.

Later the system will enter the final operation and maintenance phase. During that phase a minor development team will provide an indirect technical support.

Development Plan



Team

Team
Ibrahim Amr Ibrahim
Ahmed Hessuin
Ahmed Osama
Ahmed Saeid
Eslam Tarek
Marwan Mostafa
Mohammed Adel

Tools

LMS will be developed using open source tools, languages and servers. Commercial tools will be used in case there is no open source alternative. This will decrease the cost especially for long term operation.

While development only online tools will be used for management, tracking, testing and source control.

This will increase the collaboration between team members even they are not located at the same place.

Operation	**Recommended tools**
Source Control and Versioning	GitHub/Git
Tasks and Issues Tracking	GitHub
Structured Database	MySQL
Unstructured Database	Text file, JSON
Programming Languages	JAVA, HTML, CSS, jQuery, PHP
Operating Systems	Windows
Documents	Google Docs
Host Management	Infinityfree website
Planning	MS Project, JIRA, Project Libre
UX Design	Adobe UX Tools (Commercial, Single License), photoshop

Assumptions

- The system completely depends on personal contribution of Students and Teachers
- The system completely depends on free open source tools and languages.
- Users should approve to give the copyright of their material to the system.
- The system provides some online studying material, which teacher uploaded to his students.

Risks

Some of the features will not be developed and delivered, because the limited time available.

- Person Chat.
- Group Chat.
- Email Contact.
- Report Generation.
- Online Quizzes.