

# OBJECT-ORIENTED DESIGN OF SMALL-SCALE LEARNING MANAGEMENT SYSTEM

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## Abstract

Learning is a continuous process which requires guidance from and interaction with the instructor for two way flow of knowledge. Sitting in a classroom and listening to lecture is time restrictive. This paper is aimed to provide Object Oriented Design of a Learning Management System which takes the learning process beyond the limitations of time and location. This system will provide a platform that supplements the learning experiences of traditional class room teaching. The students are given to the lectures, notes to be followed under the learning activities and are able to take the tests online. The assessment and feedback is given online, teacher not only provides knowledge but also monitors the learning progress of students. This proposed system is an object oriented model for a small scale LMS designed to give the teachers an advantage of planning, organizing, creating and editing their course material, lectures, tests, assessment and monitoring the student's academic status.

## Introduction

Learning unlike decade back, have come out of the classroom and any time any place can be a place of acquiring knowledge with devices like smart phones, tablets, laptop computers and personal digital assistant. The student, today is a multitasking and multifaceted entity who may appreciate that her time of learning should not depend upon the time of the day. She may want to spend her day in earning the course money, organizing some event, participating in a competition or presenting her research work. But whenever she gets time in between or at late night she would like to catch up with the class notes, submit her assignments and appear for class test. On the other end of this line the teacher would also like students to go through the notes that have been prepared, get the feedback and queries, answer doubts and queries, check the submitted assignments, evaluate and give the assessment of her students. All this requires a large amount of planning, organization and distribution at the end of an educational institute.

The information explosion that came along with internet and easy availability of information to virtually everyone has questioned the benefits of strict classroom learning. The scenario of complementary needs of teacher and students can be settled through a management system that gives and interface where these two can interact on one to one basis

and get the best in this evolving learning system. The system in this proposal is not an eventual design. This is designed with a view to expand the classroom experience through the omnipresent interactive devices. This will help in generating flexible and virtual learning environment but the role of traditional classroom and teaching-learning relationship is not written off here. The proposal given here is not on global scale but on a very small scale to be used in a closed environment like an institution with limited teachers and students. This also ensures that in terms of monetary and human efforts the liabilities are minimal.

## Desired characteristics of system

Some of the desired characteristics of a Learning Management System are:

1. **Interactivity:** The aim of the system is to fulfill the need of learner and the facilitator, so it must be capable of providing interactivity at both ends. Both of these entities must be part of the development process to provide vital input regarding interactivity in the learning module. The system must give required utilities- either Menu Driven or Graphical User Interface to the facilitator and Learner for all possible activities. These activities are of two categories-Learner centric and Facilitator centric. Learner centric activities may include accessing the content, posing queries, submitting assignments, checking the evaluation records etc. Facilitator centric activities may include developing the content, managing the content, interacting with learners, query handling, evaluating etc.
2. **Integrity:** Entities for which this system is developed must be represented through specific modules and the modules must be well integrated. It means the learning activity should be standardised for them. All type of processes needed for the learning must be adequate and incorporated to support the desired goal.
3. **Flexibility:** The flexibility must be available to adapt to the requirement of the organization/institute where it will be implemented. It must adapt to the learning process, contents of the courses and pedagogical style of the institution where the system will be used. Flexibility should be in the system and not with the institution since the teachers and the student cannot change their methods of learning due to the introduction of the system.

4. Scalability: capacity of the platform of learning through this module should be independent of the number of users. If it works well for a small group of users it must behave similarly if the number of users increases after implementation.
5. Location/Device Independent: Learning System contents must be accessed easily from any location using any type of device that the learner chooses.

## Learning Management System (LMS)

LMS is tool or software that automates the learning and training processes. A Learning Management System (LMS) is a software application for the administration, documentation, tracking, reporting and delivery of e-learning education courses or training programs. LMSs range from systems for managing training and educational records to software for distributing online or blended/hybrid college courses over the Internet with features for online collaboration. Colleges and universities use LMSs to deliver online courses and augment on-campus courses. Learning Management Systems (LMSs) are reporting systems created for tracking registration, attendance, class lists, grades, test results, class scheduling, other administrative requirements of schools and instructor led classes[1]. This application can be used in educational institutes, corporate sectors and other fields where there is a need of providing some structured study material to the learners, take their test and monitor their progress. An LMS is the infrastructure that delivers and manages instructional content, identifies and assesses individual and organizational learning or training goals, tracks the progress towards meeting those goals, and collects and presents data for supervising the learning process of organization as a whole, tutorials, assignments, practice exercises, tests and performance of the users [2]. In the current documentation, LMS is designed as a framework that can handle all aspects of the learning process. An LMS delivers content and also handles registering for courses, course administration, skills gap analysis, tracking, and reporting [3]. LMS can be Web-based to facilitate access through a browser to learning content and administration. They can also be used by educational institutions to enhance and support classroom teaching and offering courses to a larger population of learners within or outside the institute. The learning system must also adopt the pedagogical method of the institute of implementation. Monitoring of the learning and skill development is also an essential activity done in LMS to match the learned and learning goals.

### A. Learning System Design

This proposed system does not generalize the implementation of a large LMS. This proposal focuses on a single institute/organization implementation to enhance the existing

classroom learning. The students should be able to access the course content provided by the teacher and should be able to keep the pace with the system whose primary focus is to monitor the student progress. This system does assume that all the students are already enrolled in the institute/college/organization and will get this facility if their course teacher uses it.

The Learning systems revolves around two factors namely: student(Learner) and Teacher (Facilitator). The whole process involves the interaction of these two entities through the interface. Interface in response to the user actions fetch the output for the learner and facilitator specific services. The proposed model defines different levels of interactions. The services like creating and announcing contents, assignments, tests, Taking test etc. will be provided to the users through the application interface, the interaction point between services and the data and files stored for the LMS. The model with these components is shown in following diagram 1.

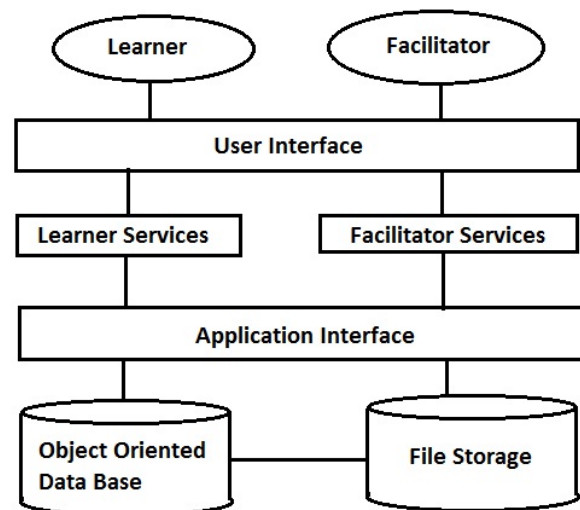


Diagram 1

### B. Interface

The interface can be provided through a variety of options like instant messaging, Text chat, Blogs, Collaborative real-time editors, Social network services, Social libraries, Virtual worlds or smartphone applications. An interactive website is the favorite and most practical option to provide interface. Any software that allows the people to connect, communicate and share information with one another through the internet can be considered suitable for this model. Learning is actually bringing together the participants at the same level so any of these tools can work well one way or the other.

### C. Services

The model defined here provides a variety of services like content upload, announcements, tests, feedback, and assessment. The students can go through the tutorials/notes/lectures available and post the queries to the facilitator. The interaction of this kind will be available to all the students accessing the application/website. Everyone can participate and benefit by the discussion with the teacher. The assignment submission by a student will be intimated to the facilitator and the also the information of the defaulters-students who have not submitted the assignment. The student can also get the practice exercises from the facilitator to carry out tasks needed to take the test. Facilitator will post the solution key of the test and also provide the assessment results. The services for the students in this regard are:

- Course Content availability
- Queries to the facilitator.
- Feedback to the Facilitator and Students
- Assignments delivery and submission
- Announcement of courses, tests, assignments and feedback
- Skill and knowledge testing
- Assessment, Reporting and learning advancement plan.

The facilitator will provide the course content accessible through the LMS and their schedule. The schedule will be designed with a keen focus on enhancing the learning of learners. If the success rate of the course plan shows the enhancement in learning and the expected outcome in terms of the grades of students. Announcements related to the content availability and assignment submission will be done automatically according to the schedule defined by the facilitator. This will also remind the facilitator to timely provide support for submission of the tutorials, assignments, exercises and tests. The benefit will be that the student performance will be managed and monitored and informed to the learner to encourage her for necessary remedies. Depending on this discussion the services identified are:

- Course Content Authoring and Delivery
- Event Management (i.e., Announcements, scheduling, tracking, evaluation, feedback)
- Providing notes, tutorials and assignment
- Individual Skills Management and Skill Gap Analysis
- Authoring exercises and tests
- Managing and monitoring student performance.

### D. Object-Oriented Design

Object-Oriented Design defines the conceptual model of a system to be implemented, studied during object-oriented analysis. For defining the OOD for the Learning Management System, various classes to be implemented, the associated constraints are identified and interfaces are designed,

finally producing a model for a detailed description of how the Learning System is to be built on concrete technologies.

The Object Oriented Design defines entities like Learner, Facilitator, Test, Announcements, Class, Course etc. The learner her is already enrolled with the institute. They will be given a login and password to use the system. The facilitator will upload the content for the students and generate announcement. The student enrolled in the specific course will be able to see the entire announcements related to the courses, assignments, tests, feedback, results whenever she logs into the system. The student will also be able to access the course content, assignment documents and tests. She can go through the course content according to her learning pace and can take the test whenever she is ready with the topic. The test will in form of objective type question submitted by the teacher in the prescribed format. Completing the test will close the test for the student and after evaluation of the test the result will be displayed for the student. The teacher can monitor the test results and she can give the next test set, if result implies that the learning aim is fulfilled else the student has to go through the content once again. This process of content reading and test will be repeated till the learning goal is achieved measured by the score of the student.

The teacher will be responsible for evaluating and monitoring the results and giving appropriate feedback to the students. The function for the teacher module will be according to the schedule created by the teacher. Whenever a teacher logins into LMS she would get the alerts informing about all the activities like assignment drafting, Content preparation, Test submission, evaluation work to be done. In addition to this the System may provide an interface by which she can initiate a conversation with the students enrolled in her course for discussion on the content, test or assignment recently assigned to the students. A very restricted and minimal Object Oriented Design of the system given in the diagram 2.

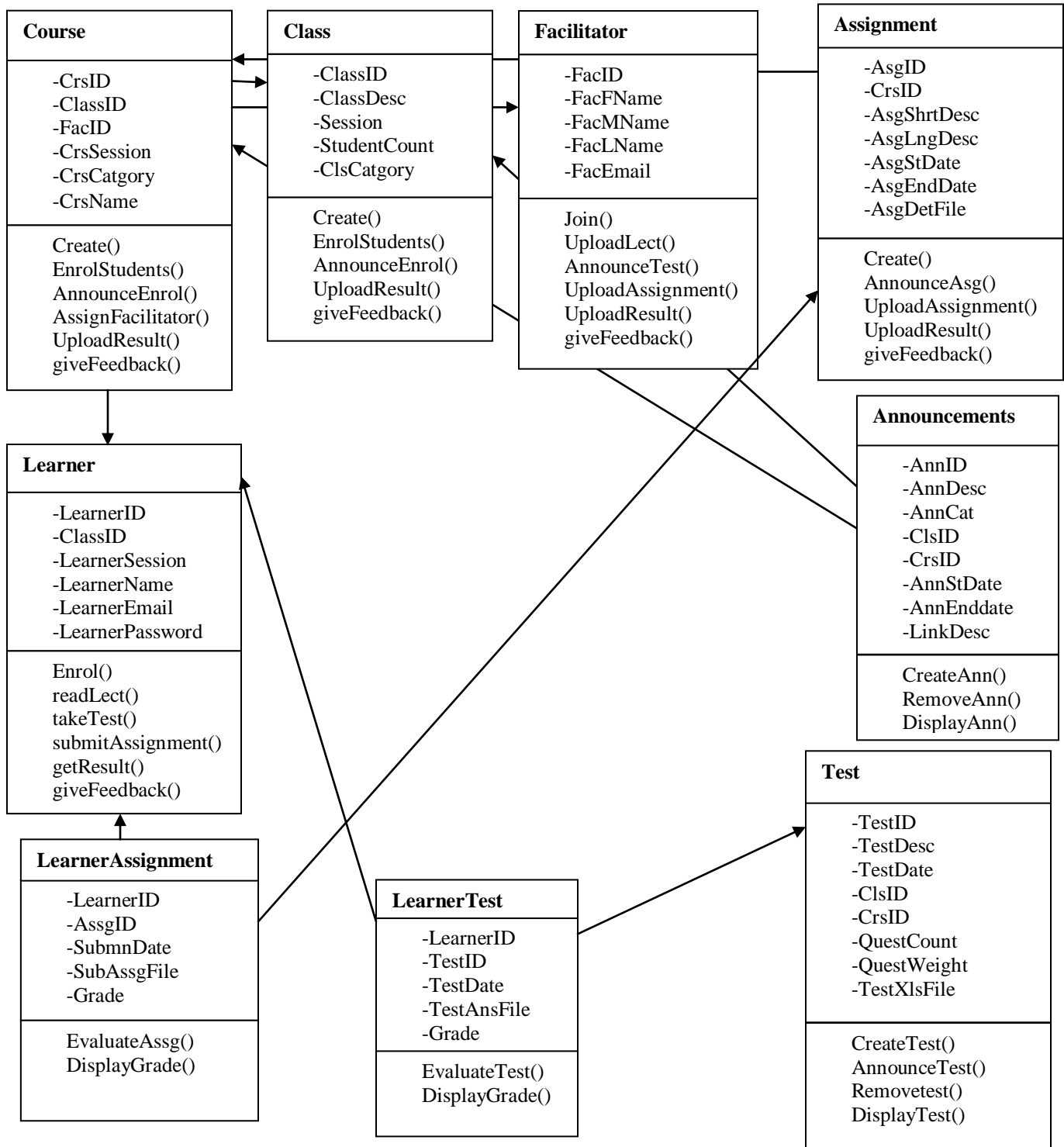


Diagram-2

## Conclusion and future work

The advancement in technology and its usage in teaching is very beneficial but it can never replace the classrooms. The presence of teacher generates an interactive and conducive environment where students can communicate with each other. The system discussed here only provides an extension to this activity. This gives a platform using which the experience, creativity and knowledge of the teacher take the shape of a multimedia rich content to be used again and again. This system shifts the focus from the curriculum to the content that provides better learning avenues and a more enriching experience. The students who may face limitations in classroom due to time or lack in interaction skills, will be more comfortable in learning at their own pace. Feedback from the teacher and online interaction can give them better guidance to learn.

The present proposed system is an effort to achieve the goal of invasive learning but is partially defined. Here only an Object Oriented design is given for the very basic sections of the whole system, In future it will be extended by defining the feedback and discussion modules. The model proposed is designed for a college having about 5000 students enrolled in undergraduate and postgraduate classes. It will be implemented as an interactive website.

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## Biography

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