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# LMS for Computer Science students

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**Abstract**

Anytime, anywhere learning is the order of the day. Research studies have proven that 'learning through LMS' is beneficial; rather that experience is a vital need for today's world. In India, even in higher and professional education, only a very few autonomous institutions and deemed universities provide the learning experience though LMS. In a developing country like India where the professional institutions is growing in number and where the percentage of employable graduates needs to improve a lot, LMS experience is more likely to enrich students and equip them with an improved learning outcome and other employability skills like Self Efficacy, Confidence in Communication. The experience is proven to reduce Computer Anxiety in students. But, why 'learning through LMS' is not very common in Indian Universities? The answer may be 'it is a new paradigm of learning'. It means the procedures and relevant facts are not unfolded to the stakeholders of LMS Design, Development and implementation. The stakeholders are institution administrators, teachers, experts and students. A website is designed and LMS Moodle is configured to administer Computer Science courses. To start with, a course 'Object-oriented Methods' is designed, developed and delivered through Moodle. The key objective of this paper is to discuss how a courseware can be designed for Computer Science course to be administered through LMS Moodle and then in detail the various benefits, issues and challenges with reference to this course through Moodle. Weighing benefits on one side and issues and challenges on the other side and seeing the trends in higher and professional education, LMS learning exposure may be utmost useful and effective for students and hence teachers of today and in the near future.

**Keywords**: LMS – Learning Management System.

# 1. Introduction

'Anytime, anywhere learning' is the order of the day. We see that in many countries, even schools offering courses through LMSs like Blackboard and K12. In India, very few autonomous colleges and deemed Universities offer the opportunity for the students to work through LMS. Research studies have proven that 'learning through LMS' provide many advantages in the higher and professional education as it helps in preparing the students for better employability, which is vital in higher education. What prevents such a tool to be used more commonly by the various Indian institutions? The answer may be 'it is a new paradigm of learning'. Lack of knowledge and awareness on the various connected issues has to be addressed to solve this situation. As any other new paradigm, acceptance by the various stakeholders needs time and efforts. Let us discuss the steps, benefits, issues and challenges involved in the process.

# 2. Development of Courseware for LMS And Implementation

## 2.1 Development of Courseware for LMS using a Pedagogical Model

- Learning though LMS is a new paradigm of learning. So, a pedagogical model considered as a basis may give a lot of clarity to begin with.
- Pedagogical basis may help in filling the gaps between the steps in the procedure. In essence, a smooth implementation can be rendered by the 'vision' gained from the proven pedagogical basis.
- Any future modifications or upgrading of a course is facilitated by the sound pedagogical basis
- Any research outcome in pedagogy can be utilized in the enhancement or in the future evolution of the system
- Theoretical foundation helps to enable modularity. It is easier to execute the development and implementation of courseware as teamwork.

## 2.2 Course through Moodle for Computer Science Students

A website is developed and LMS Moodle is installed to administer Computer Science courses through LMS Moodle with a vision to empower Computer Science students with improvement in 'Learning Outcome'. The first course taken is Object Oriented Methods. It has 3 modules. Each module is implemented using [Ref 1] Gagne's Model. Implementation as per the steps of Gagne's Model, for the 3 modules is briefly described below.

## 2.3 Moodle Modelling [Ref 2]

- **Gaining attention –** This is done by having the right headings for topic/weekly sections thereby designing an effective layout.
- **Describe goal –** this is done by putting topic/week's goals and objectives in the topic summary area.

- **Stimulate Prior Knowledge –** A review quiz is used to recall prior and background knowledge on the subject matter
- **Present material –** Video content is presented to create interest in the subject area and text content is given to the students to aid them in preparing for examination and to enable them gain terminology in the subject area. Thus lesson content is administered to present information in a way that is accessible for all learners
- **Provide guidance –** The guiding faculty are well informed to be available through forums and other communication activities within the course and provide adequate scaffolding for activities
- **Elicit performance; practice**
  1. Get students to apply new knowledge and information, reflect on it in a practice exercise and present a summary showing how they applied the information.
  2. Choose the type of practice exercise based on the nature of the module. For Programming exercises, give assignment and let students discuss on the problem through blog.
  3. For knowledge based and creative work, let students participate in the forum and discuss – forum steered by a faculty and also experts.
- **Provide feedback -** this can be through the Moodle forums or by commenting on blog posts and summaries etc that are presented. Peer feedback is also very valuable and could be done through forums, blog comments
- **Assess performance -** Moodle quiz, assignment, foums and workshops are used for assessment purposes
- **Enhance retention and transfer –**
  1. In this course, the third module is designed for this purpose.
  2. A case study or a mini Project can be given for them to work in forth-coming topics/weeks.
  3. Giving a preview of the next steps and how this particular subject matter will play a part in what is to come will help students see relevance and significance,

This step will in turn help transition them to next topic and retain engagement.

### 2.4 Salient features in Implementation

- This course administered through Moodle is rendered as a supplementary content to the main stream. So students can participate without fear of Examination / results, as it is purely on an outcome basis.
- Lessons are rendered both as a Video and a text-based study material
- Questions in the quiz have been designed to test the different levels of learning reflecting Bloom's taxonomy
- Forum topics are carefully formulated according to the nature of the module – descriptive and creative.

- Priority and weightage in formulating the questions for various assessment modules is based on the nature of the Module – i.e., Module 2 – Object Oriented Programming is Skill-based and the other 2 modules are more based on Knowledge, Attitude, exercises being given accordingly.
- Learning Outcome of the participants will be assessed after the 3 modules are administered.

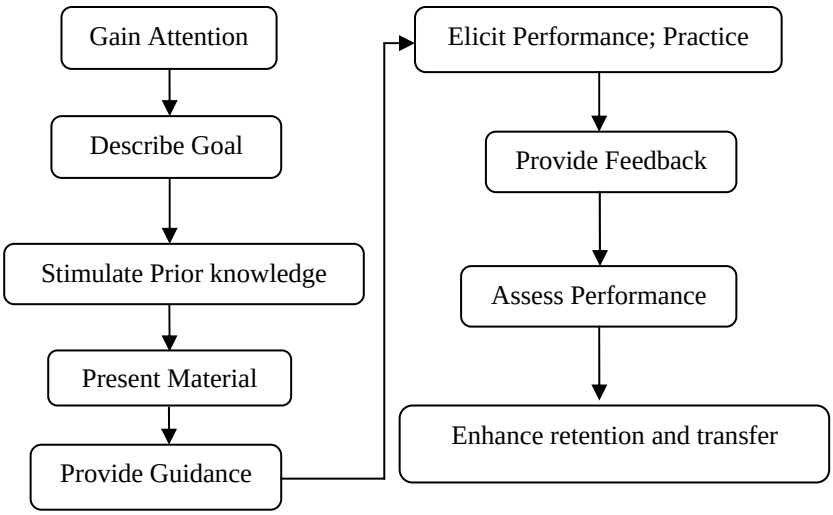


**Fig. 1**: Block Diagram of Gagne's Model.

**2.5 Advantages**

Administration of a Computer Science course through LMS Moodle is expected to create the following impact on the Computer Science students.

- **Improve Learning Outcome [Ref 3]**

Students are expected to achieve higher order learning outcomes as a result of learning through LMS. Students must be able to achieve higher levels of learning outcome to shine in their Project work and job. Most of the college students in India, study just before their internal tests and mainly during Study holidays just before Final Examinations. As a result they forget the subject leant very easily when they complete the exams. While they manage to get a decent score with preparation for such a short duration, it is evident that they will achieve higher order learning when they are exposed to academic environment created by the forum and such social media on a regular basis.

- **Improve Self Efficacy [Ref 4]**

When students take up the stepwise learning procedure at their place and time of convenience, at the same time their peer-group interaction is activated, they get involvement in subject and learn better. When students are supposed to do a Project work and then when they start working, they will have to learn new software packages

and applications by themselves and equip themselves for their job. Self-efficacy is vital at this stage.

- **Reduce Computer Anxiety in a few students [Ref 5]**

Educational institutions plan the time of students with a schedule to cover the curriculum in time and then prepare and practice the students for good results. In consequence they can allocate only very less time for the students to spend in the Computer Labs. Working for an online course may reduce the Computer anxiety to a great extent.

- **Improve Confidence in Communication [Ref 6]**

Interaction with peer-group, teachers and experts through 'forum' is expected to give them Confidence in Communication. Communication in a technical subject area requires a little more than just the language skills. Terminology and usage must be gained while reading course lessons but Confidence is attained only when they use it in communication. Social Media in the LMS can give that opportunity within time and with some fun.

- **Create / improve interest in the subject area [Ref 7]**

Interest in a subject is vital for learning to get started. Though it depends on learning style of the individual, Social Constructivism which forms the basis of Moodle assures the creating improving the student's interest in the subject area. Social Constructivism also motivates the students to take up further / deeper learning and work in the subject area [give definition of Social Constructivism Ref 8]."All of us are potential teachers as well as learners - in a true collaborative environment we are both", "We learn particularly well from the act of creating or expressing something for others to see"

### 2.6 Issues [Ref 9]

Implementation of an LMS involves resources to start as well as while running. The list includes an own server [or hired server space], manpower trained in technology, pedagogy and also in content development. And hence needs continuous support from the Management.

### Challenges

**Teachers**: A teacher takes multiple roles while directing and running a course [Ref 10] as a content developer and who steers the various activities in the course, interacting with students and experts in forums, design, develop and conduct the quizzes, assignments, forums.

- Time and effort constraints

Nature of job – They are busy with lecture sessions, record maintenance for ISO&Accreditation, question paper setting, correcting the answer sheets, interacting with students, formalities

Challenge is to learn the paradigm first, then prepare the course content and the various assessment documentations as per the formats compatible to the LMS courseware within the available time.

**Advantage:-** Once the courseware is developed and implemented at least once – teacher will find it more easy day-to-day handling and will start seeing much better performance from the students – improving with time.[Ref 11]

- Team building constraints
- Knowledge leadership
- Resource constraints

**Participants**

- Students have to learn the technology to get used to the new paradigm of learning
- Difficulty in availability of internet time to work with the LMS

**Advantage**

When the students spend the time and effort to learn this at least once, their gain is much more.

## 3. Conclusions

We are moving towards 'Online age'. Learning through LMS will also help 'Learning/working beyond time and space constraints/boundaries'. In addition to the advantages of online learning, it enables the students and also teachers to utilize their time well and equip themselves for the modern methods. We are approaching the age of Self-learning without which students, thereby teachers also may find it difficult to survive.[Ref 12]

While the threats for online learning are from the 'Affective Domain' aspects of learning,[Ref 13] ie., value-based content, interaction with teachers, experts, peer-group interaction supported by teachers may help them develop a lively academic atmosphere [virtually].Such a balanced and proven method may be fruitful in the long run.

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