



# EXPERIENCES IN DEVELOPING E-GURU LEARNING SYSTEM, COURSE DESIGN AND TEACHING METHODOLOGIES AT SANKARA SCHOOL OF EDUCATION AND LEARNING

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## ABSTRACT

Learning Management System is a process of delivering learning process and tracking learner details. Many very good comprehensive proprietary packages are available. For in-house system, many free, open source solutions are available which can be adapted in any manner needed. This approach however, might require more initial development and different skill sets among staff to ensure the robustness of the system, to provide a higher level of on-going technical support, to prepare documentation and training, and to interface with other systems as necessary. The choice of Learning Management System is based on the needs of the course, without consideration of costs, the availability of qualified staff or any requirement to use existing systems. Content Management Plays an important role to the learner to access the content in a rapid manner.. As Content and storage increases Learning objects offer a new conceptualization of the learning process: rather than the traditional "several hour chunk", they provide smaller, self-contained, re-usable units of learning. Most institutions are less concerned about exact definitions for learning objects and more concerned about whether these objects are being used in a sound pedagogical manner. The educational strengths of a learning object for application might then include a number of characteristics, such as its **granularity** (can be small, manageable chunks of learning content), its **reusability** (can be applied to different learning objectives) and its **aggregation potential** (can be customized).

**Keywords:** *Learning Management System, E-Learning, Content Management, Learning Objects, Students, Professor*

## 1. INTRODUCTION

Learning Management System (LMS) is the term used to describe a server-based system that is designed to manage learning content and learner interactions. The LMS enables the learning content to be available online, allowing students to view and interact with learning materials through a web browser on essentially any computer operating system or even on a mobile device with browsing capability. Learners access these materials and use them in ways specified by the professors. Such systems generally support instructor directed classroom learning. However, such passive systems have limitations in the current educational trends. These trends are that Learning now takes place in many environments other than formal education at teaching institutions. Learners can also be students in individual institutions or they can be in industry, Learners now come with different motivations and have different learning objectives (Biggs,

2000). There are learners who are specifically seeking training in some area, and those who have the motivation to become experts in their area. Different methods of instruction are often appropriate for these different classes of student. There is more emphasis on constructivist learning within a self defined or at least flexible context. There is greater emphasis on groups in large classes. Such groups often require more guidance (Biggs, 2000) whereas growing classes and increased internationalization and class size make such guidance more difficult to provide on an intensive and personal face to face basis. These trends call for new methods of instruction (Koper, 2000) and new ways to use technologies to support these methods. In summary, the general trend is to more personalized learning where learners define their learning plans and the LMS constructs and supports the learning process. A LMS system must adapt to these methods and provide personalized proactive support to learners. We call this kind of

LMS an active LMS. An active learning management system assists learners to develop and follow a learning plan to satisfy their learning objective. The learning plan includes a number of learning steps to be followed to reach the learning goal. The active LMS should provide assistance to progress through these steps. An active LMS goes beyond simply allowing students to learn at their own pace but actually decides what to learn. This contrasts with current learning management systems, which present materials and require learners themselves to use them in pre specified ways. The production of learning content for computer based training is demanding and expensive. It is therefore a necessity to reuse e-learning material as many times as possible. Unfortunately, existing electronic courses are seldom reused, as there is usually always a need to change some part for a new course to be held To encourage reuse, the approach widely proposed is to use small modular *Learning Objects* that can easily be assembled into new courses (Downes, 2001). Despite the many standardization activities, there are no established specifications for the structure of learning content itself. Learning Objects today come in a variety of data formats (HTML with JavaScript, Shockwave, Flash, Java). Most of them are individually designed and styled, and navigational and user interface controls are directly integrated into the Learning Objects. Aggregating them to courses is hardly possible, due to inconsistencies in the graphical and navigational design. This prevents the presentation of aggregated learning modules to learners in a Coherent way

## 2. INTRODUCTION TO LEARNING OBJECTS

'Learning Objects' represent a relatively new method of subdividing courses into smaller modules to give courses a flexible and reusable structure. According to Kovalchick and Dawson (2002), a Learning Object is defined as follows: Any digital resource that can be reused to support learning. The term 'Learning Objects' generally applies to educational materials designed and created in small chunks for the purpose if maximizing the number of learning situations in which the resource can be utilized. Working with Learning Objects gives a wide range of flexibility for both the course providers and the users. For example, the structure makes it easier to suit different learning styles and the reusability makes it easier to make new courses tailored for new customers. Below we will discuss the use of Learning Objects in research-based continuing education in applied statistics.

## 3. WILEY CLASSIFICATION OF LEARNING OBJECTS

Wiley (2000) provides a classification of types of learning objects, making it easier to understand the nature of the elements contained in it:

**Fundamental** – The basic and most simple form of learning aid. A simple image depicting ,a stage of a surgical procedure

**Combined-closed** – Still a simple element but one that integrates more complex mechanisms in order to provide an explanation. An animation or video clip depicting a surgical procedure, including audio

**Combined-open** – Several simple objects encased inside integration elements. An integration element (i.e. a website) that includes the image and the video clip of the surgical procedure, along with the use of plain text explains the procedure

**Generative-presentation** – Combination of objects providing advanced visual and additive capabilities with limited interactive features. A dynamic Flash animation is capable of generating and recreating a visual picture depicting a surgical procedure and its inherent operational conditions

**Generative-instructional** – Combination of objects providing advanced visual and auditive capabilities with advanced interactive features, allowing a high level of hands-on experience. A dynamic Flash animation, linked to an image and text database, is capable of generating a graphic environment depicting a surgical procedure and its operational environment, where users can manipulate surgical instruments and monitor patient vital signs .in order to provide hands-on instruction [1]

### Learning System E-Guru



Fig-1 Main Screen of E-Guru

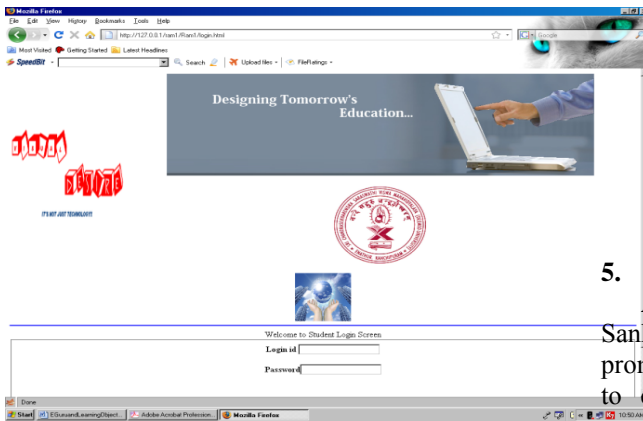


Fig-2 Login Screen of E-Guru

E-Guru is intranet based LMS, designed with accessibility and adaptability in mind. Administrator can install E-Guru using EASYPHP. **Fig-1.** The main screen of E-Guru. **Fig-2** Logging Screen of E-Guru. Educators can create material using PowerPoint, Interactive Flash Content, and redistribute intranet-based course content to easily retrieve the content, and conduct their courses online. Students can learn in an online learning environment. For the installation of E-Guru it is necessary to have the following software: Apache 1.3.27; PHP 4.33 for Windows version 4.3.8; MySQL version 4.0.15; and PhpMyAdmin, for administration of the Database.

An LMS objective is to simplify the administration of learning/training within an organization/institution. It helps to keep track of learner's progress in the course by online discussions with the mentor on a particular topic or lesson. Assigning and displaying grades and assessing student's performance and also tracks learning path details of the student.

**4. SANKARA SCHOOL OF EDUCATION AND LEARNING OBJECTIVES**

- To reduce classroom training and enhance online training.
- Student cognitive structure increases by accessing the online material any number of times.
- Exchanging ideas and gather information with peers on a particular lesson/topic/concept increases the knowledge effectively.
- Students exchange knowledge through bulletin boards and other areas related to information technology.
- At the end of every online chapter, student assessment conducted and progress is

monitored/tracked at every end of the chapter.

- Periodic online tests like quiz are conducted at the end of every lesson/topic/concept which will enhance the potential knowledge of the students.
- Periodic assessments are monitored by the staffs.

**5. SANKARA SCHOOL OF EDUCATION AND LEARNING - INTRODUCTION**

Sankara School of Education and Learning is promoted by Department of Computer Applications to enrich knowledge in students mind and to promote online learning environment. They are handled by highly qualified staff and personalized individual attention to the students is the hallmark of the institution. The unique feature of Sankara School of Education and Learning is that it symbolizes the ideals of education expressed in our scriptures and literature, in building discipline and character, encouraging appreciation of our cultural heritage and cultivation of genuine devotion to God, respect to Guru, parents and elders. The Sankara School of Education and Learning constantly strives to implement innovations in teaching and evaluation, keeping pace with the global trend in education.

**6. SANKARA SCHOOL OF EDUCATION LEARNING MANAGEMENT SYSTEM (SSELMS)**

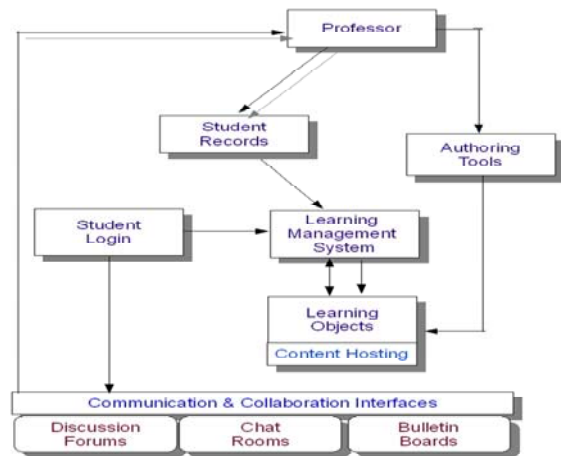


Fig-3 : Sankara School of Education and Learning Management System

Sankara School of Education and learning Management System as shown in Fig-1 & Fig-2 is developed using PHP 4.33 for Windows version

4.3.8; MySQL version 4.0.15; and PhpMyAdmin, for administration of the Database where professor student are the actors who are involved to initiate the Learning Management System E-Guru where the content development is build using learning objects which is called as Sankara School of Education and Learning Objects (SSELO) as materials where professor develops materials and uploads in learning management system for student retrieval according to their learning styles and assessments in performed at the end.

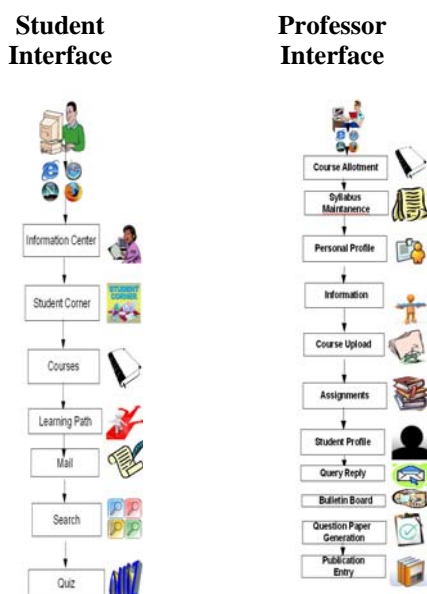


Fig-4: Learning System E-Guru deployed in Sankara School of Education and Learning (SSEL)

E-Guru Components are as follows

#### Student Interface:

- **Information Center:** Which displays information about Assignments Deadline, Weekly Examinations and other related details.
- **Student Corner:** which guides the student on exam tips, health tips, positive thinking attitudes towards examination.
- **Courses:** Displays various number of topic/lessons for a particular course.
- **Learning path:** The chosen route, taken by a learner through a range of (commonly) e-learning activities, which allows them to build knowledge progressively.
- **Mail:** This provides a interface between Professor and student where knowledge exchange and arising doubts in student mind is solved in this interface.

- **Search:** Search facility is used for searching materials for a particular topic/lesson/course.
- **Quiz:** After completion of the course every student has to undergo an online quiz and he/she can guide themselves where they stand.

#### Professor Interface:

- **Course Allotment:** This module is used for course allocation for each faculty
- **Syllabus Maintenance:** Syllabus is maintained for the entire course like MCA(Regular) / MCA(Lateral Entry)
- **Information:** Faculty profile can be updated frequently.
- **Course Upload:** Professor will upload as a Topic/Lesson/Unit to the students.
- **Assignments:** Every professor uploads assignments to the students where it takes care of Assignment-ID, Title, Assignment Deadline date etc.
- **Student Profile:** Maintains student assessments and other related details
- **Query Reply :** This is used for answering the queries that are initiated by the students.
- **Bulletin Board:** A system that enables users to send or read electronic messages and other data that are of general interest and addressed to no particular person.
- **Question Paper:** This module performs tasks related to paper setting.
- **Publication Entry:** Professor who have published papers relating to their subject can be stored in this module.

#### 6. SANKARA SCHOOL OF EDUCATION AND LEARNING MODEL METHOD (SSELM)

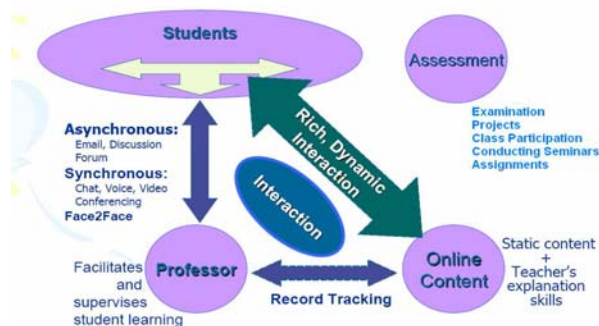


Fig-5 Sankara School of Education and Learning Model

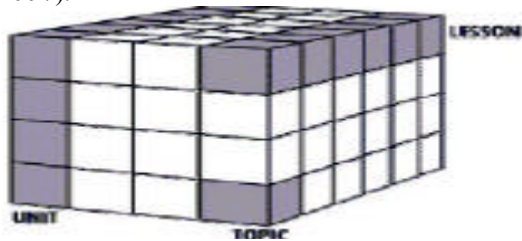
The model shown in Fig-5 is followed in Sankara school of learning depicts four states Students, Professor, Online Content and Assessment.



Students go through online content stores in their cognitive structure, rephrase them and raise doubts to the professor either asynchronously (or) synchronously. Professor tracks student learning knowledge by assessing them by giving online examination, projects relating to the course, giving them a topic relating to the course and discuss in the class, conducting seminars giving assignments and store them in the student database. The feedback form will be given to the student regarding with online content.

**7.A STUDY OF NETg Learning Object Model**

NETg was one of the first to use the LO concept for its IT courses. It has a hierarchy of 4 levels – course, unit, lesson and topic. A course contains independent units. A unit contains independent lessons and a lesson contains independent topics. A topic represents an independent learning object that contains a single learning objective and has a corresponding activity and assessment (L'Allier 1997).

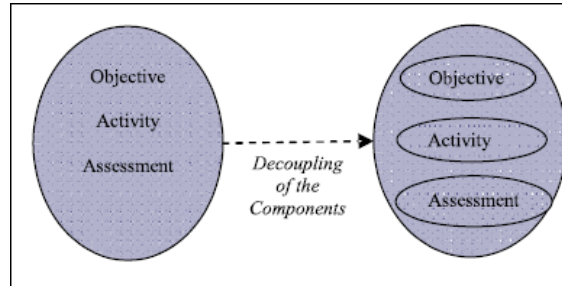


**Fig-6:NETg Learning Object Model (L'Allier 1997)**

The above model is not flexible because of tight coupling of some components within a topic. In NETg a topic is a collection of components which essentially surround a single and specific learning objective. The components are Objective, Assessment and Activity[2].

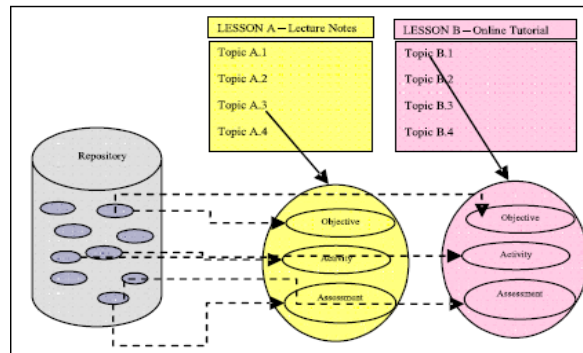
**8. PROPOSED SANKARA SCHOOL OF EDUCATION AND LEARNING OBJECT MODEL (SSELOM)**

We proposed a model called SANKARA SCHOOL OF EDUCATION AND LEARNING OBJECT MODEL ((SSELOM) which account for reusability for instance a given Assessment surrounding a particular concept can be reused with another topic surrounding the same concept in Fig-7 given.



**Fig-7:Sankara School of Education and Learning Object Model (SSELOM)**

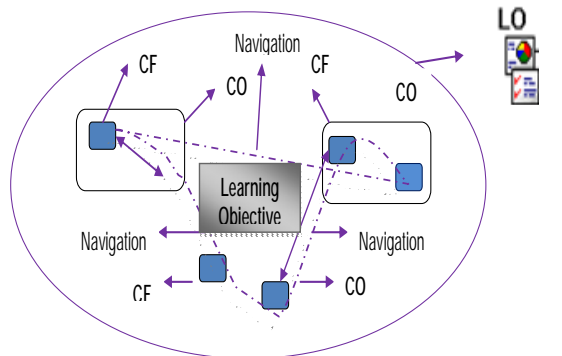
Fig-7 depicts two different topics with two different lessons which happen to cover the same objective, learning object from the repository as well as the assessment component as both topics have the same objective, even though different activities were used to deliver the objective.



**Fig-8: Topic based Decoupling of Sankara School of Education and Learning**

The main objective of Decoupling is the topic can be made reusable many number of times[2]

**9. SANKARA SCHOOL OF EDUCATION AND LEARNING METHODOLOGY**



CO→Content Objects LO→Learning Objects  
 CF→Content Fragments  
 → Navigation ↔ Learning Path

**Fig-9: Learning Object Content Model (SSEL Model of Learning)**

**Content Fragments** content units in their most basic form, like text, audio and video. These elements can be regarded as raw digital resources. Content fragments shown in **Fig-4** can be further specialized into discrete (graphic, text, image) and continuous (audio, video, simulation, and animation) content fragments. They represent individual resources and can be combined at any point of time .

**Learning Objective** is a statement of professor's expectations from student performance at the end of a specific lesson, topic or unit covered show in

- **Fig-9.** It forces the professor to think about three questions in mind What will the student be able to do as a result of completing the lesson?
- How well, must the student perform the task to PASS?

Enabling Objectives specifies a detailed sequence of student activities. The force applied to the professor's mind structure is to think through the steps involved in completing the task in the (Terminal Learning Objective) TLO. The Educational Objective (EO) usually form the outline for the instruction phase of the lesson plan. It helps the professor to think through a cycle of questions:

- What is the first thing, that the student must be able to do (know)?
- When that is complete, what must he/she do (know) next?

**Navigation Facilities** The student can go through learning object screen any number of time to enrich the knowledge and skill and get trained to reach the learning goal shown in **Fig-9 [3]**.

## 10.TEACHING METHODOLOGY AT SANKARA SCHOOL OF EDUCATION AND LEARNING

The description of the model can be done via a schema based on five steps:

1. Presentation of a typical problem within one of the contexts
2. Description of the concept that can be used to formalize the problem
3. Examples of the concept
4. Logical development of the concept
5. Application of the concept for the solution of the problem in point

In order to organize the contents of the materials, two distinct aspects are considered for each concept: **level** and **context**. Two levels especially

are taken into consideration: high school and university (graduate level) and the context within these can be Computer related subjects.

Points 1 and 5 are related to the context and, in some way, are independent from points 2, 3 and 4. For each concept,

two macro-stages should be considered:

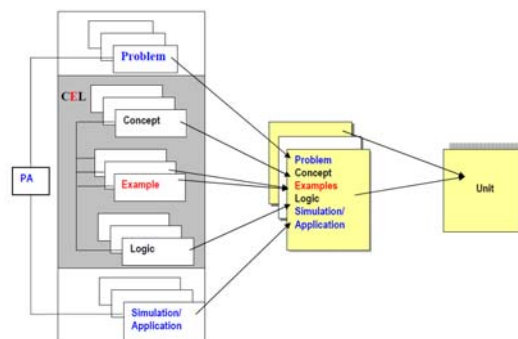
**Context -> PA: Problem + Application**

**Levels -> CEL: Concept + Examples + Logical development of the concept**

The project starts with the realization of a prototype regarding a particular topic and the implementation of L.O. of the five types following the steps:

1. Setting of a concept
2. Choice of the context and the problem
3. Production of the text of (CEL)
4. Realization of different macro-stages (PA one for each context)

The following schema describes the relations between the five types of L.O. and the organization of the database in order to achieve the units. The L.O. can be organized in blocks composed by five L.O., each e-learning unit is produced using such blocks connected differently.



**Fig-10: E-learning Unit Methodology Teaching at Sankara School of Education and Learning**

### Type 1: Problem

The problem is presented using video or animation. The video can be a short movie captured in a normal live context in which the problem is presented in a very informal way.

### Type 2: Concept/Logic

L.O. present the concept by means of mathematical formalism, using the correct symbols in a clear and synthetic way.

The concept can be a new object (definition) or a property (theorem). The proof is an optional part and is present only for particular theorems. In order to allow the production of macro-units for two different levels (high school and graduate) the

complexity of the L.O. could be different but in some way the more specialized parts should be a continuation of the basic ones in order to avoid replication of the contents. L.O. can be created via presentations with an audio track.

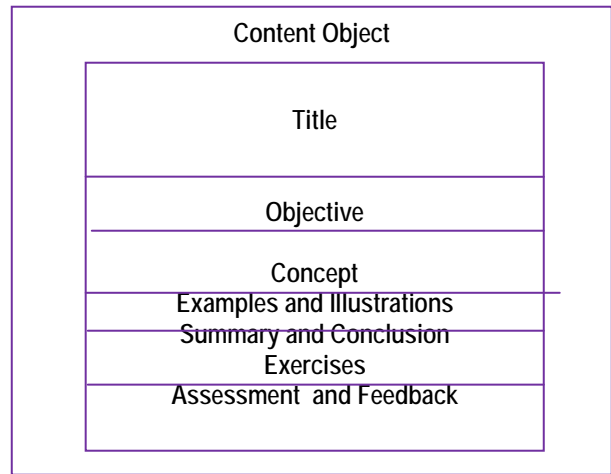
**Type 3: Example**

Examples are used to understand the concept and its practical applications. They can be produced via animations

**Type 4: Application**

The solution of the problem is presented using video or animation similar to the continuation of the presentation of the problem underlying the usefulness of the mathematical content of the core CEL. The video of the problem and application can be part of a longer movie which can be used for class of L.O. concerning different aspects of the same problem or different stages of the solution to the problem[4]

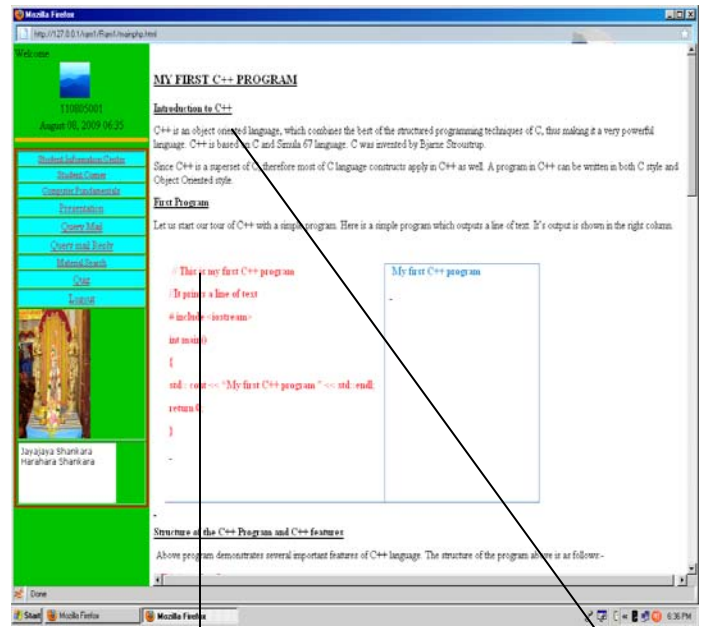
questions and compare the results with the hidden solutions to be provided for each chapter/topic [3]



**Fig-11: Content Object Methodology at Sankara School of Education and Learning**

**11.CONTENT OBJECTS**

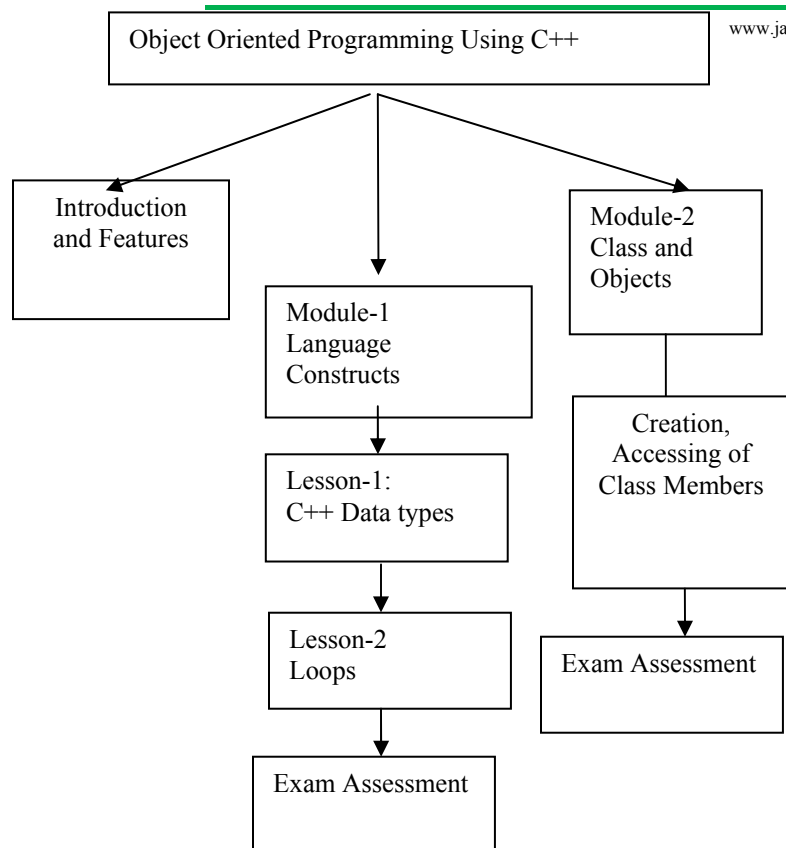
The content object shown in Fig-11 contains the core content of the subject. The learning object can be treated as to have two levels, the first being the chapter level and the second being the topic level. The topic level is formed with a combination of assets, such as a learning objective, explanatory notes, examples and an end of topic exercise. A chapter level is considered to have aggregation of topics and some chapter exercises. Some of the attributes in the content object, can be of domain – independent, like the examples or illustrations and some can be domain specific situation (example or illustrations which fits in certain circumstances) depending on the type of the subject and the context of learning. The content objects, that are considered to be domain-independent, are highly shareable and reusable e.g. purpose and descriptions of content objects and the attributes of the content object at the chapter level include; chapter number, respective subject code, level of education, chapter title, learning objectives, aggregation of topics to accomplish the respective learning objective. The attributes of the topic level include a topic title, some text and examples. This will give freedom to students while accessing learning material, giving the possibility to choose either the whole chapter or just to go for certain section(s) of their need. The assessment object is embedded in the content object and can be represented in two forms of exercise; the end of chapter exercise and the end of topic exercise. The design is to be of self-assessment type, where students will attempt to answer the



Content Object

Learning Activity

**Fig-12: A Learning Object with a content object in the form of a simulated browser environment shows C++ Tutorial**



**Fig-13: Organization Structure of the Course at Sankara School of Education and Learning**

## 12. MOS-SOLO – LEARNING OBJECT EDITOR

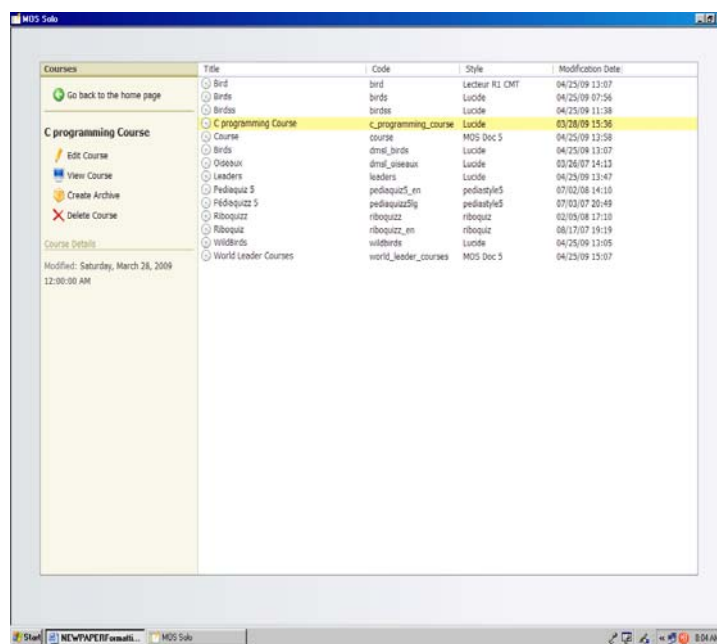
MOS Chorus is a Web Application to create and deliver SCORM content: courses, assessments, presentations, surveys. You can manage courses, monitor user progress and share your company's knowledge.

MOS Solo is a Windows application to create learning courses, presentations, assessments and surveys. The courses created are SCORM conformant and can be viewed in a Learning Management System or directly on the Internet.

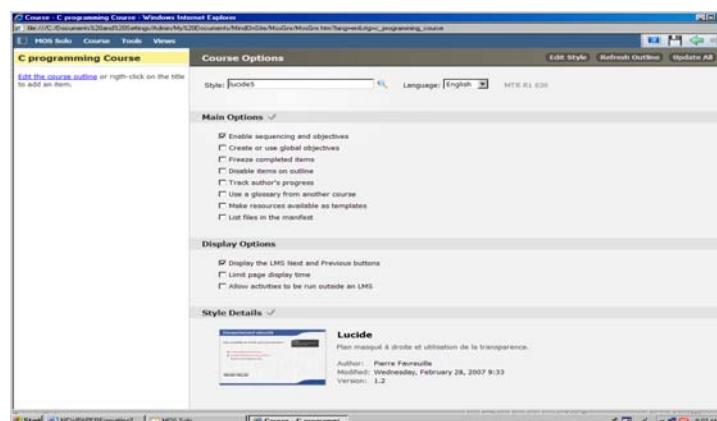
It is available at

[http://www.moschorus.com/centre/MosPub/solo\\_en/index.html](http://www.moschorus.com/centre/MosPub/solo_en/index.html)

The above course which is described in **Fig-13** is developed using MOS SOLO.



**Fig-14: Displaying Course in MOS SOLO**



**Fig-15: CourseOptions availability in SOLO**

## Acknowledgement

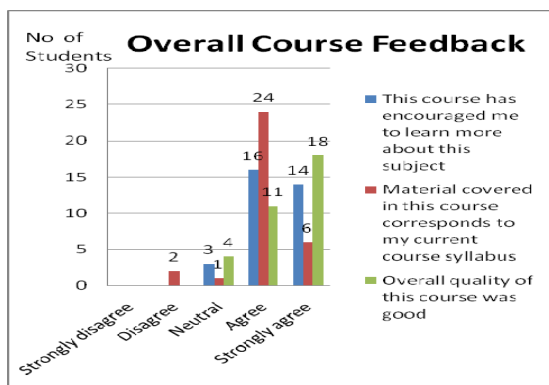
I thank the institution which has given me the opportunity to develop and implement the project successfully.

## 13. RESULTS AND DISCUSSION

To improve the progress of the students of programming language, learning objects are used as a learning material for students who have different study backgrounds. Some students are theoretical but few have knowledge on programming skills, The focus is mainly concentrated for 1<sup>ST</sup> year students of MCA course on Object Oriented programming in C++ The study was organized for the students who have an idea on programming



knowledge. By studying the online material it will yield very good results. The survey questionnaire was distributed among students and was asked on material coverage according to the syllabus and overall quality of the course as shown in **Fig-16**



**Fig-16: Overall Course Feedback of students of IST Year MCA at Sankara School of Education and Learning**

The gathered experience provides a profound basis for the improvement of the learning objects regarding their quality and quantity. Interactive learning object is an idea that many professors welcome for the search of new methods and support for the novice programming students. It is quite clear that students believe that the learning objects can be useful for them as novice programming students. But it is quite clear that more introductory session and better integration of learning objects is needed to encourage students to use them more frequently as a normal part of programming study. Learning material must be easy enough to learn for the student rather than extensive learning material study outside the class room

## 14 CONCLUSION

In the era of education, learning objects present the next generation of digital learning. They provide a new world of easy accessible and individual learning made possible by the flexible deployment over networks of small, reusable components from multiple sources. The organization will have a greater control over their instructional content, resulting in better customization of their learning programs using learning content management system.

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