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Experiences in Developing Learning Management System E-Guru and Content Production Acquisition, Creation of Learning Objects in Sankara School of Education and Learning

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Abstract: 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. The production of learning content for computer based training is demanding and expensive. It is therefore, a necessity of re-use e-learning material as many times as possible. Unfortunately, existing electronic courses are seldom reused, as there is usually and always a need to change some part for a new course to be held. To encourage reuse, the approach widely proposed is use small modular learning objects that can be assembled into new courses.

Key words: E-learning, learning management system, content management system, learning objects, xerte

INTRODUCTION

Over the years, learning technologies have advanced tremendously and offer many strategic features to improve the functionality of an organization as well as its learning and development division. Today, both a Learning Management System (LMS) and Learning Content Management System (LCMS) are considered central parts of an organization's learning and development program. In fact, an LMS and LCMS are almost required for organizations to manage course content and track learner's performance successfully. An LMS is a software application or web-based technology used to plan, deliver and manage all learning events within an organization, including online, virtual-classroom, instructor-led and blended courses. In general, an LMS provides a training manager, trainer, etc. with a means to assess and raise competency and performance levels throughout the organization, but it typically is not used to create course content. The advent of the Internet has increased the possibilities with respect to education. Educational theory has begun to examine the effect of the Internet on teaching and learning processes. Much promise has revolved around curriculum development and content creation. The question becomes one of how? How should curriculum be developed and content created in the new digital world? There is a new way of looking at the curriculum in which, content is broken up into discrete pieces (knowledge bits) or learning objects. Teachers and learners, then, go about the process of creating linkages between chunks (learning objects) in order to construct understanding. The term learning object, first popularized by Wayne (1994) has become the Holy Grail of content creation and aggregation in the computer-mediated learning field.

Learning objects: The Learning Object (LO) can be considered as a new type of data in the oriented objects paradigm field and in the same way, it can be a whole new instructional paradigm beyond the computing support. So, instructional designers can build a small instructional pieces, which can be reused as many times as necessary, instead of the traditional way to build the whole course. The LO known as digital entities in the Internet are for many users with the right permission (if there are any). Moreover, the LO cab may be upgraded without updating the courses. The learning standard technology committee gives the following definition: A learning object is any entity, digital or non-digital, which can be used, re-used or referenced during technology supported learning. Examples of technology-supported learning include computer-based training systems, interactive learning environments, intelligent computer-aided instruction systems, distance learning systems and collaborative learning environments. Examples of learning objects include multimedia content, instructional content,

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learning objectives, instructional software and software tools and persons, organizations, or events referenced during technology supported learning every LO is composed of two parts, the content and the label (or metadata). The metadata describes the content of the LO, i.e., key words related author, languages and objectives, educational.

Level, version, date, location, etc. The metadata is necessary because the LO can be stored in repositories from where they can be taken to build courses. These repositories normally are made using database software.

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 (Carlos, 2007).

MATERIALS AND METHODS

The LMS 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. Figure 2 logging screen of E-Guru. Educators can create material using power point, 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.

Fig. 1: Main screen of E-Guru

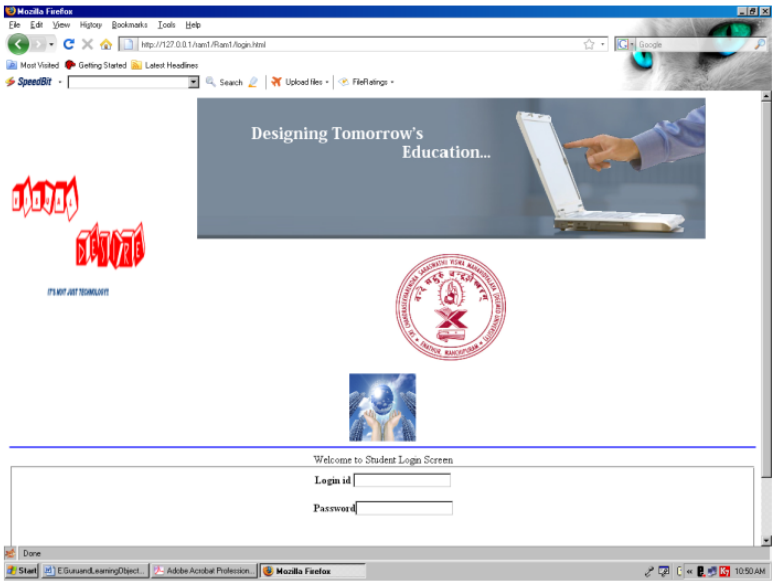

Fig. 2: Login screen of E-Guru

Sankara school of education and learning objectives:

- To reduce classroom training
- Student knowledge is increased by accessing the online material any number of times
- Exchanging ideas with peers on a particular topic, which will increase the knowledge effectively
- Students can exchange the knowledge through bulletin boards and other areas related to information technology
- At the end of every online chapter, online test is conducted and students progress is monitored at every end of the chapter
- Periodic online tests will increase the potential knowledge of the students
- Periodic assessments can be conducted by the staffs

Learning content management system: Figure 3 is used to build, assemble, publish learning content (more specific called learning objects).

Subject matter expert/author: Subject matter expert shown in Fig. 3 is responsible for ensuring that the content of the online course is an appropriate alternative to the lecture content normally given in a traditional course. In addition to that exercises, activities and examinations needed to reinforce the new learning methodology. Other tasks are as follows:

- Identifying or creating textbooks, readings and resources
- Ensuring pedagogical match among the course objective contents, exercises, examinations and assignments
- Identifying materials that require copyright clearance and providing the instructional designer with the necessary information
- Providing other team members with a legible copy of any written material

Graphical (visual) designer: Course materials can be enhanced for education by including technical drawings, illustrations, graphics and photography to interpret course content, which is shown in Fig. 3. Visual design for electronic courses or optimal electronic enhancements of print-based courses includes the development and creation of generic or customized templates, navigational icons, icons or images to aid the recognition of location within a non-linear presentation of materials and visuals or graphics to enhance the learning content.

The visuals will help students especially those who are new to the online learning to encounter the online course, which can often set the tone for their learning experience.

Web developer: Web developer should show the faculty the example of online materials that illustrate the various kinds of content and interactive options that are available to them, which are shown in Fig. 3. It should then describe the faculty how their courses can be produced using a consistent organizational template that can provide students with knowledge of the learning objective, a

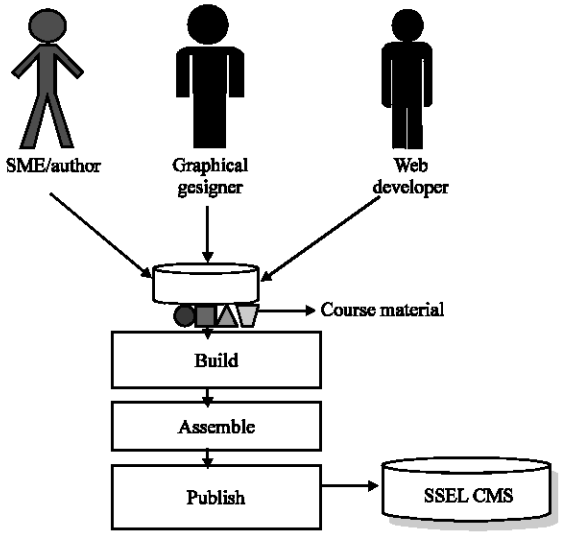

Fig. 3: Sankara school of education and learning content MGMT system

outline of the content, assignments, evaluation information resources, links, a list of requirements and Frequently Asked Question (FAQ) (Singh and Sharma, 2004).

Learning content acquisition, structuring in Sankara school of learning: In the Sankara School of Education and Learning, we examined alternative ways for rapid low-cost production of new course-ware and found an answer in the so-called learning objects. These are reusable components that can be recombined in multiple ways to produce new courseware. To benefit from the full potential of learning objects, such as re-usability, component categorization and high levels of interactivity, we chose not to use a standard authoring tool.

Instead, we decided to develop a proprietary activity in Sankara School of Learning Content Management System (SSLCMS). The two activities involved in structuring courseware is acquisition and structuring. The research is mainly oriented towards the practical realization of Sankara School of Learning Content (SSLCMS).

As the process is still an on-going one, with a shared focus on representation and management, we are still not able to draw a clear line between these two activities.

Step 1: Acquisition: Eminent professors who are handling the courses for post graduates are able to identify the student potentiality and develops materials from novice to expert level of knowledge in the field of technology. A major challenge is to acquire appropriate learning material from each individual professor suggested by Kerres (2001). Most of the professors have an opportunity to restructure the learning material. Taking into account, the acquisition method is as given:

- Collect the learning material by interviewing a professor, using the following questions
  - What is your view about the subject importance to the students?
  - What is the scope of your topic?
  - To what type of situations does your topic apply
- Roughly order the collected learning material
- Let the professor review the ordered material and remove irrelevant or redundant parts. This is a collaborative process where external advice from supervisors, students and peers may be of use
- Categorize the learning material according to the type of knowledge concerned
  - Collection of learning material
  - giving rough order sequence
  - Carrying extensive review by removing unnecessary parts
  - Categorizing according to knowledge

Step 2: Structuring: Course material is made in a sequential order so that the students can be able to understand the concept easily and there after the material will be, problem specific.

- Divide the course into smaller units or chapters
- Redefine chapter classifications to suite the chunks of all scripts
- Choose an optimal overall form by assigning chunks into chapters and restructuring the whole scripts separate for each topic
- Call professors to review the chapters or units, aiming to uphold or boost the quality and consistency of the course (Christine *et al*., 2002).

Content fragments: Content units in their most basic form, like text, audio and video. These elements can be regarded as row 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.

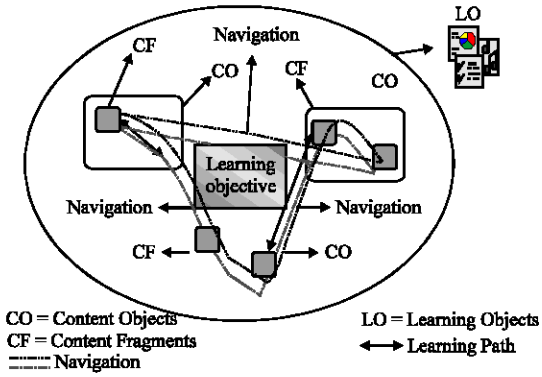

Fig. 4: Learning object content model (SSEL model of learning)

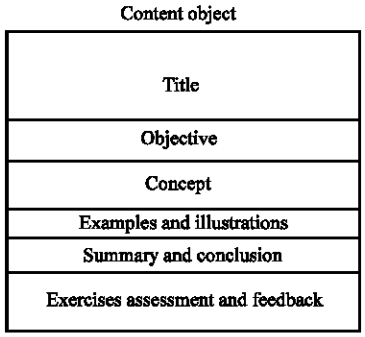

Fig. 5: Content object methodology at Sankara school of education and learning

Learning objective: A statement of professor's expectations from student performance at the end of a specific lesson, topic or unit covered show in Fig. 4. 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. 4.

Content objects: The content object shown in Fig. 5 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 questions and compare the results with the hidden solutions to be provided for each chapter/topic (Lujara *et al.*, 2007).

Learning path: Defines sequence of learning activity (linear or non-linear) that is carried out by learner going through the learning unit. Learning path can be defined as:

- Generic path with free sequencing through all learning activities in the learning unit

In E-learning the participators in the educational process are not only for the students and teachers but also authors of learning objects, designers of the course or the learning unit, which are discussed in Fig. 6 (Tuparova and Tuparov, 2006).

Xerte-learning object editor for creating learning objects for content management-an introduction: The Xerte project provides a full suite of tools for e-learning developers and content authors. Xerte is a fully-feautured learning development environment for creating rich interactivity.

Content development is created using xerte. Xerte is an open source software package for creating interactive E-elearning content, http://www.nottingham.ac.uk/~cczjrt/Editor/: the Flash-ased learning xml editor and run time engine that makes it easy to create and deploy interactive learning objects that are highly accessible and SCORM compliant… helps you focus on interactive design by providing tools that are fit for purpose and easy to use as shown in Fig. 7.

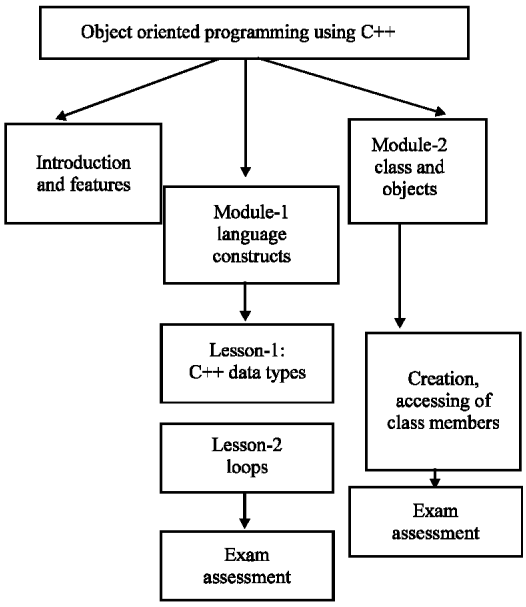

Fig. 6: Organization structure of the course at sankara school of education and learning

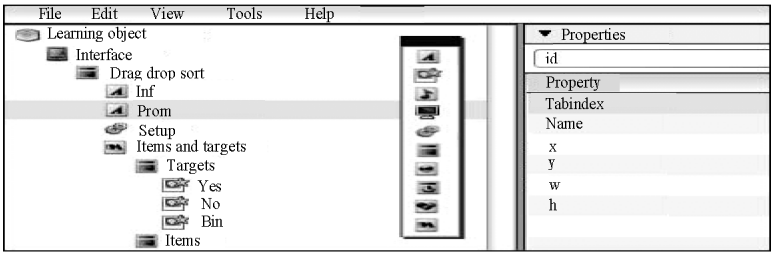

Fig. 7: A screen shot of the rlo illustrating the icons, which contain contents

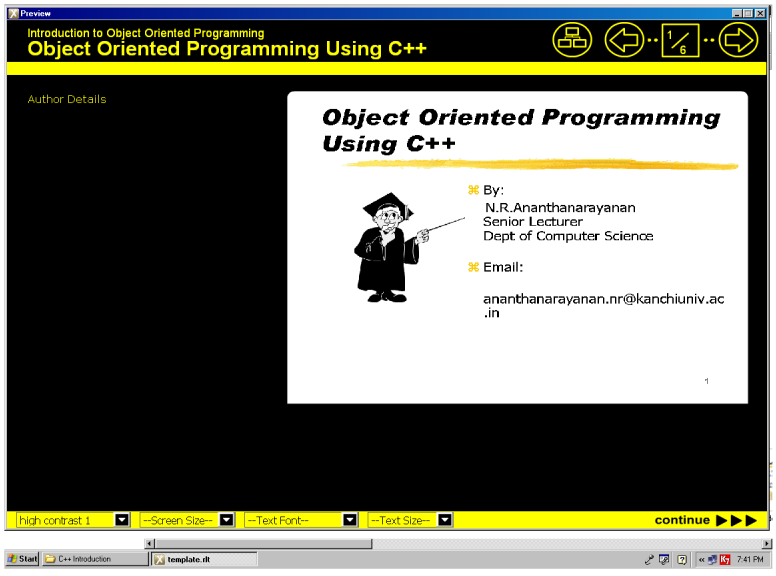

Fig. 8: Introductory session about the professor who is conducting C++ programming course

Using xerte editor the content modules are made up of components of text, graphics, multimedia, images, video and audio. The content developer can combine text, graphics and images; video and audio to create pages of lessons, courses and end with curriculum, which are shown in Fig. 8. Learning object screenshot for C++ programming course.

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 IST 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. 9.

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.

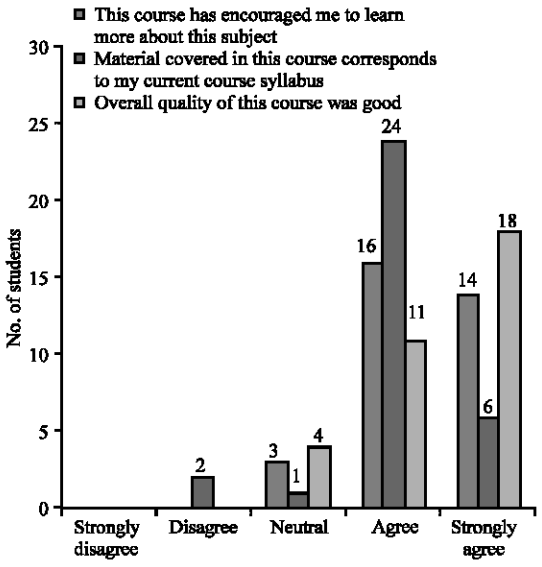

Fig. 9: Overall course feedback of students of IST year MCA at Sankara School of Education and Learning

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.

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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