

Feature Article: E-Learning Content Development and Hosting

1. Introduction

The rapid growth in the web technology and its ever increasing usage has given unprecedented opportunities to provide information to the students not only within the four-walls of their class rooms but also in the comforts of their home all over the globe. The changes, mainly driven by the new technological innovations and the new learning environment, has presented a scenario where student have access to a vast array of information in many fields from experts all over the world.

The online learning has rejuvenated the basic concept of education and its mode of delivery. The potentials for online delivery of education has increased multi-fold with increased in number of Internet users. The Internet and web technology, as a new media of information delivery, facilitates real-time interaction between students and instructors that traditional written correspondence courses or video cassettes-based courses or other methods of remote instructions cannot offer.

2. Definition of E-Content and its Components

With rapid growth of information and knowledge, e-content is the most preferred solution for learning effectively and efficiently. E-content can be defined as digital learning material that is specifically prepared for imparting education online. e-Teaching or blended-learning is combination of conventional teaching and eLearning which uses digital media. Units of e-Content can be categorized as:

- i) **Asset:** The smallest element of content is called an asset, i.e. asset is a single building block of e-content such as an graphics, text, animation, etc
- ii) **Learning Object:** Several assets assembled together to explain a concept form a learning object. The assets inside an object have to be structured pedagogically.
- iii) **Learning Module:** A learning module consists of learning objects that are combined together

pedagogically to explain a topic. It is strategically structured, including motivational aspects, presentation of content, quizzes, and self-assessment, etc.

- iv) **Learning Unit:** A learning unit corresponds to an entire teaching unit. It combines e- modules within a pedagogical framework imitating environment of a traditional classroom.
- v) **Course:** A course consists of structured combination of learning units.
- vi) **Scenario:** Documented guide including text, audio-visuals and instructions for a unit of course is called a scenario. Using a scenario, other teachers can very easily reconstruct and use the material that come with it.

3. Component of E-Learning

The content prepared for e-learning aims at delivering a course in an interesting manner with help of all possible media support like text, animation, simulation, graphics, etc. As such, the task of designing e-learning material is highly specialized and requires domain knowledge, expertise in different types of software tools that can be used to enhance the content with multimedia and expertise in instructional technology. As such, the process of content creation requires marriage of two types of expertise, i.e. domain knowledge and web / instructional designers or multimedia script writer. A combined team of these personnel can make the content livelier and also facilitate representation of the content in logical sequence. The logical sequencing and delivery of content is as important as the content itself since the objective is to assemble content that is easy to comprehend and easier to remember.

The e-content must offer tangible value-addition and skill-building to the participant. The content should not be a copy of a books or lecture notes delivered in a class. If the e-DDD does not offer immediate benefits in terms on concept building, in-depth understanding and interaction with the students, the

content need restructuring and repurposing. The National Mission on Education through ICT (NME-ICT), that funds projects on content development across several disciplines, prescribes four quadrant approach for effective and efficient development of e-content. These four quadrants are:

- i) **First Quadrant:** First quadrant defines the structure of course along with textual content. It comprises of basic description of a module, prerequisites (in terms of knowledge background of a user before taking-up a module), introduction, objectives, keywords, summary, textual content (details of textual content on the topic, subtopics with examples and applications from day-to-day life, illustrations and chunk text).
- ii) **Second Quadrant:** The second quadrant comprises of multimedia enrichment of content that may include audio or video clips, animation, simulations, virtual labs, etc.
- iii) **Third Quadrant:** The third quadrant provides for links to external resources available on the Web as well as supporting material. For example: Did You Know?, Points to Ponder, Glossary, FAQs, link to Wikipedia, other websites, blogs, discussion forum, etc.
- iv) **Fourth Quadrant:** Fourth quadrant includes the self assessment material. Assessment and evaluation questions may be in different format like multiple choice questions, true & false statements, sequencing, match the columns, problems, quizzes, etc.

4. Stakeholder / Entities in Content Creation

The following two entities are involved in the process of content creation:

- i) **Content Writer (CW) / Domain Expert (DE):** Content writer is the domain expert who plays a central role in the process of content development. Content writer delivers on the subject of his / her expertise. He / she possess domain knowledge of the subject and is responsible for packaging the content in an interesting way imbining frills and frolics of web technology. While preparing the content, the content

writer should keep in mind the learner's profile, expectations from the course and the time available for e-learning.

- ii) **Technical Experts:** The following two types of technical expertise is required in the process of e-content development:

- **Multimedia Experts:** Multimedia experts, has rich experience of graphic design (images, animation and simulation) as well as in converting the storyboard provided by the content writers into real multimedia content in different formats such as animation, simulation, etc.
- **Web experts:** Web expert install / develop and maintain the Learning Management Software (LMS) where all the content are uploaded following a pre-defined pedagogical framework.

5. E-Learning Models

The three types of e-learning models are as follows:

- i) **Virtual Classroom Model:** The virtual class room uses video conferencing facilities wherein the mentor and student interact over a web based server through education software. The virtual classroom requires installation of basic infrastructure like video conferencing facilities, computer with high speed processor, power back up and high speed reliable Internet connections at both the ends. This feature of e-learning takes away the load of distance and brings all the students and teacher at one platform and creates classroom like environment. Virtual classroom model offer synchronous communication.
- ii) **Online E-Learning Model:** This model of e-learning is significantly different from the earlier one and is dependent on courseware delivered over the Internet to learners at different locations where the interaction between the learner and the experiences of their learning occur via network systems. Online e-learning model essentially offers asynchronous communication.

iii) **Fast E-learning Model:** This model is further development of the above two models wherein combinations of the above two models are used to impart training to the end-users. This model offers a blend of asynchronous and synchronous communication.

6. Platform, Standards & Digital Preservation

Educational materials in audio-visual formats do not ensure student participation. As such, it is important to incorporate interactivity to ensure effective learning. Combination of text, graphics, animation, video and interactive quizzes is a better approach. The most appropriate content format may be determined based on the student learning outcomes required, i.e. simulations, debates, discussions, etc.

Moreover, all content must be fully SCORM (Sharable Content Object Reference Model) compliant to allow interoperability and consistency. SCORM is a collection of standards and specifications for web-based e-learning that is commonly supported by most Learning Management System (LMS). Learning content should be modular to encourage mix-and-matching of existing content and should be designed using the latest standardised technologies.

6.1. LMS Platform

Content creation and its delivery can best be done using a SCORM compliant Course Management System (CMS), also known as a Learning Management System (LMS) or a Virtual Learning Environment (VLE) accompanied with a back-end database to facilitate effective content development and deployment. A user can draw maximum advantage from the digital content if they are available through an LMS with facilities to search and browse all the content hosted on an LMS with provision to track and report on learning progress. The LMS should facilitate deployment of centralised assessments as well as flexibility to faculty to host their own assessments and quizzes for students. The scores, results and other relevant data may be shared with universities and central educational authorities, as and if required. The LMS should have the following features and functionalities built into it:

- Support for text, audio, video, animation and graphics.
- Suitable metadata schema and taxonomy with facilities to tag content type, language, level of content, etc.
- Support multiple languages and translation services from one language to another.
- Support role-based log-ins for content creators, moderators, users, etc.
- Support qualitative assessment of content through rating mechanism by the users and reviewing mechanism by experts.
- Support mechanism for moderation of uploaded content.
- Support innovative financial models to reward content creators.

6.2. Metadata Schema for Digital Content

The content in an LMS typically consists of two components, i.e. content in digital format and its metadata. The metadata provides bibliographic or index information for the digital content. While digital content are the primary documents that users wish to access, it is metadata that facilitate their identification and location using variety of search mechanism. The metadata should not only be assigned to search subject coverage of digital content, but also to document its technical details and structural organization so as to facilitate navigation within a digital document and to ensure its longevity.

6.3. Digital Preservation

Although, the digital technology offers several advantages over their print content, it along with other associated Internet and Web technologies are in continuous flux of change. New standards and protocols are being defined at regular intervals for file formats, compression techniques, hardware components, network interfaces, storage media and devices, etc. The digital content faces the constant threat of "techno-obsolescence" and transitory standards. There is a constant threat of backward compatibility for products including software, hardware and associated standards and protocols that were used in past. Maintaining access to digital content over a long period of time is much more challenging than their paper counterpart. A number of long-term and short-term digital preservation strategies, such

as copying / backup, refreshing, replication, technology preservation, migration, emulation, encapsulation, software re-engineering, universal virtual computer, etc may be deployed. However, deployment of a single solution would not be appropriate for all data types, situations or institutions, As such, a set of digital preservation strategies can be applied depending on the life span of digital content. It is strongly recommended that essential elements of digital preservation should be in-built into the projects on digital content creation to ensure long-term availability of digital content.

7. Recent initiatives on Content Creation under the NME-ICT and NPTEL

The Ministry of Human Resource Development (MHRD), under its National Mission on Education through ICT, has sanctioned a number of projects on content creation to various higher education institutions in the country. Under National Programme on Technology Enhanced Learning (NPTEL), course contents for engineering and science disciplines are developed for free online access. In phase I of NPTEL project, 135 video courses and 125 web courses were developed and are accessible freely through NPTEL website at <http://nptel.iitm.ac.in>. Content creation, using four quadrant approach, for more than 996 courses in over 20 science and engineering disciplines, covering

both undergraduate and postgraduate courses is underway. More than 20,000 lectures will be recorded in the engineering and technology disciplines during phase II of NPTEL, making approximately 500 video based courses. The MHRD, under the NME-ICT, has also sanctioned funds to the Consortium for Education Communication (CEC) for developing e-content in 19 subject areas at undergraduate level. Moreover, funds have been made available to the UGC for developing e-content in 77 subject areas at postgraduate level using expertise available in universities and colleges.

8. References:

<http://en.wikipedia.org/wiki/E-learning>


http://www.elkindia.com/e-learning_content_development.htm

National Mission on Education through Information and Communication Technology (<http://www.sakshat.ac.in/PDF/Missiondocument.pdf>)

<http://www.cec-ugc.org/>

Guidelines for E-Content Development (2007 – 2012)

(www.ugc.ac.in/financialsupport/xiplan/EContentxiplan.pdf)

<http://www.illdu.edu.in/> 

Onsite/In-house Training Programme on SOUL 2.0

1. Banaras Hindu University, Varanasi, January 23 – 27, 2012

The Banaras Hindu University, Varanasi, organized five days In-house training programme on SOUL 2.0 at Banaras Hindu University Library, Varanasi, from 23rd to 27th January, 2012. As BHU is one of the biggest library system in the country having more than 32 departmental libraries. Recently, Central library has adopted SOUL 2.0 software after evaluation of its advanced features and stability in the profession help them to switch over

from other commercial software to SOUL 2.0 software for smooth functioning of the library activities. In lieu of this Centre has supported them to convert data from other commercial software to SOUL software and also extended support for customization of the software as per their requirements. More than 100 staff members were participated in the programme. Dr. A K Srivastav, Librarian, was coordinator of the programme. Sh. H G Hosamani, Scientist C (LS) and Sh. Divyakant Vaghela, Scientist B (CS), acted as resource persons from INFLIBNET Centre, Ahmedabad. 