Requirements for WEB based courseware delivery system

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Abstract: The article describes some common features of distributed learning environments. Main requirements for virtual learning environment are described. Different roles used in learning environment with their meaning are presented.

Key words: Distributed learning environment, Courseware delivery systems, WEB Based learning, e-Learning

INTRODUCTION

Web based learning has become very popular in our days not only in universities and colleges, but also in different vocational training forms. The virtual learning environments (VLE) have many advantages such as no limits of time and space, asynchronous learning plan and so on. The learners could follow their own learning rhythm, depending on their own learning habits. Even though distributed learning is widely acceptable method of learning and teaching it is not easy to develop, establish and maintain because of couple of reasons such as: face to face communication, personal attention, personal assessment that are all native for traditional instructor led training. When designing VLE some errors may accrue, because of difference between informational web sites and VLE. Most serious errors have been errors of educational and course design like [3]: Failure to engage the learner; Mistaking "interactivity" for engagement; Focussing on content rather than outcomes; Mirroring traditional didactic approaches on the technology. To be successful VLE have to take into account this special features and to grant functionality that allow: Learning to be active; Learning to be collaborative; Focusing on the Learner; Learning to be distributed; Content to be Reusable and Stable; Making submission of Evidence of Learning easy; Providing feedback on Learner Activity; Low IT Skills requirements - natural for the different user groups way of using VLE without the need of special learning how to learn/teach/author by means of VLE - in fact one of the most important requirements for VLE.

REVIEW

In traditional distance education courses, learners receive a self-contained set of print materials by mail and then work alone on the course package and a set of assignments. Over the years, some of these courses have added additional elements such as broadcast radio, TV programs, audio- and video, or CD-ROM multimedia disks. The use of teleconferencing or email groups in some courses allows a degree of discussion and opportunities to connect with other students directly. But distance or correspondence education is essentially based on individualized learning. Distance education courses typically use the Web in a similar way. Students may receive and submit material and comments electronically, but the instructor is still operating on a one-to-one (individualized) or one-to-many (broadcast/lecture) basis, with limited opportunities for group interaction and collaborative learning. Six key elements of distance education can be defined [3]:
- Separation of learner and teacher
- Influence of an educational organization,
- Use of media to link teacher and learner,
- Two-way exchange of communication,

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- Learners as individualized rather than grouped,
- Educators as an industrialized form.

The principal characteristic of any form of distance learning is that the student does not have to be present in a classroom in order to participate in the instruction. Broadly defined, distance learning is any approach to education delivery that replaces the same-time, same-place face-to-face environment of a traditional classroom.

Using the Internet for educational delivery has enabled an entirely new modality of education to emerge—online education—profoundly distinct from yet clearly related to traditional distance and classroom education. Depending on the time and place attributes online education could be divided into two major categories of interaction [2]:
- Same Time/Different Place Interaction,
- Different Time/Different Place Interaction.

Same time/different place technologies (synchronous communication) include audio teleconferencing, audio graphics, teleconferencing, video conferencing, and real-time chartrooms. The educational approach is similar to the face-to-face lecture, except that students are at a distance from the lecturer and from one another.

Different time/different place (asynchronous) interaction refers to technologies that support or enable interaction among users (either instructor-learner or among the learners) at times that best suit them as individuals. Since the early 1980s, these technologies have been referred to as CMC (computer-mediated communication). This is framework for distributed learning, which integrates learning objectives, instructional models, and enabling technologies.

The network technologies provide more powerful opportunities for organizing teaching and learning [3]: network-mediated online collaborative learning environment. Its conceptual framework includes the following features:
- Group communication (many-to-many),
- Anyplace (place independence),
- Anytime (time independence),
- Multimedia-based,
- Computer-mediated communication.

E-learning is loosely defined as “using new multimedia technologies and the Internet to improve the quality of learning” (European Council, Lisbon, March 2000). It is a term roughly encompassing all education-related activities based on information and communications technologies (ICTs) that:
- Provide an effective approach to learning
- Transcend the traditional classroom learning paradigm
- Utilize new multimedia technologies to enrich the learning content
- Take advantage of the Internet for easy access to related resources and services
- Enable communication, remote exchanges and collaboration of the actors (e.g. learners) of the learning process
- Empower the learner to improve his/her knowledge and skills in any situation, be it at school, university, work or home
- Overcome limitations of time and space imposed by classroom offered lectures

Using common Internet tools like Internet browsers, Internet broadcast tools, e-mails, web publishing wizards and another Internet features are not enough convenient for educational needs. The trend is that new system architecture serves for all educational and administrative needs beginning from learner enrolment to diploma issue. That new form of educational structure is frequently called Virtual University.

**REQUIREMRNTS FOR CHARACTERISTICS, FUNCTIONS AND ROOLS FOR VLE**

Target group auditory has to be taken into account when preparing personalized content or presentation. Different groups have different type of learning habits. Most
common target groups may be defined as follow [1]:
- Corporate learners – this type of learners works for the different type of organization, and the management staff – usually training department makes decision for staff learning depending of organization needs and plans.
- Professional experience learners – This kind of learners usually make decision for learning because of need for career development.
- Degree completition learners – Learners of this type are working adults that have to complete their education because of their current job requirements have changed or expected to be changed.
- College learners – Persons in this group typically have no working experience. This is the group of traditional students.
- Pre – college learners –these learners are interested in doing baccalaureate prior to the completion of high school. This segment may be interested in getting a jump-start on college.
- Test preparation learners – learners from this group learn for different type of examination passing. Examples of this kind of group are persons that learn for professional certificate issued by technological company like Cisco, Oracle, Microsoft, etc.

Implementing learner-centred approach typically, most of today’s systems use a structure for grouping users with common privileges that can perform some type of actions. This structure – Role is not a real user, but a way to systemize users. Users that belong to different roles receive different kind of functionality they can perform and they are expected to have different kind of behaviour when using educational environment. With other words roles are predefined structures that are used for assigning functionality and/or for administrative purpose. Users may belong to more than one role. Predefined roles are different from group of users some courseware author or trainer may define in their classes for reaching his/her educational goals.

Most of the systems require user registration. After registration to determine who is currently logged for personalization courseware delivery systems require user name and passport. After log-on process is finished systems “know” which profile to use for particular user and to which roles he/she belongs. When logged, courseware management system provides a different view of the environment depending the roles. The roles can be divided in two major groups – Learners And Staff (Courseware designer, Trainer, Administrator, Mediator)

Typically to each role are assigned users. Users can perform activity defined of the roles they belong to. Permissions that user receive by membership in different roles are cumulative.

Each course can have any number of users that belong to role Learner. Users that belong to learner role cannot manipulate the course content (other than in the student presentation areas as defined by the designer). These users can change their own passwords or same personal data. Student profiles are maintained by many systems to support personalization of courseware content. In some systems members of student role may make annotation and breakpoints in the courseware content they can use for future learning or discussions. The learner is central part of the most of the today system so the major efforts are made to facilitate effective learning. Learner centered and group centered approach is essential for collaborative learning.

Each course has at least one member of the Author role. The courseware author is designer of the courseware content, and provides way/ways for effectively passing the course in general view - courseware-passing scenarios. Which of the ways will be used depends of the learners' profiles that system creates for each user. Normally, the courseware author is member of the instructor role of the course he/she created. The
members of author role can manipulate the course content, create quizzes, define views, train the trainers, etc.

Members of Trainer role can alter grades, check student progress, define student presentation groups, manipulate students’ accounts, assists the learners in the educational process, acting as producer of diagnoses, mentor, assignment evaluator, coach, etc. Members of trainer role are responsible for educational process of every students group they lead. In some systems there is possibility trainers to form trainers community groups.

Members of Mediator role – facilitates the navigation of the other participants, acting as information communicator, user profiles producer etc.

Usually role of Administrator contain at least one member that could not be deleted. The members of administrator role can initialize and delete courses, make course or resource temporary unavailable, change system settings and maintain technical aspects of the system.

Common tools that many systems provide can be grouped in the following groups:

- **Course Delivery Tools**
  - Course delivery: Appropriate presentation of adequately organized learning content according to the specific lay-out of web-based documents, considering cognitive and ergonomic features.
  - Automated Testing and Scoring: Instructors can create true/false, multiple choice, multiple answer, ordering, fill-in-the-blank, matching, and short answer/essay questions
  - Course Management: Instructors can selectively release materials based on specific start and end dates
  - Student Tracking: Instructors can get reports showing the number of times each student or all students in a course as an aggregated group accessed course content and discussion forums. Instructors can set a flag on individual course components to track the frequency with which students access those components.

- **Student Involvement Tools**
  - Groupwork: Instructors can assign students to groups. Each group can have its own shared group presentation folder, discussion forum, chat room, group email list, assignments, activities, assessments, group email list, and journal area
  - Student Community Building: An optional administrative module supports building of student communities with online interaction, information sharing, and communication outside of the course through clubs and study groups.
  - Self-assessment: Instructors can create self-assessments. The system automatically scores multiple choice, true/false, and multiple answer type questions and can display instructor-created feedback

- **Productivity Tools**
  - Upload Features: tools that allow instructors and learners to send multimedia files from their local machines to the set of servers. Learners electronically submit their assignments, and the instructors organize and comment on these submissions. The exchange of project files between learners, unformed group of learners and instructors or group of instructors are very important.
  - Full-text searching and hierarchical catalog: This tools is used in many systems for presenting additional reading or when browsing digital library catalog. This is an additional feature that some systems.
  - Bookmarks: Students can create and categorize annotated bookmarks in a course folder.
  - Orientation/Help - The system includes simulation-based, online courses that describe the role of students in online instruction
- Plan/Progress Review - tools which allow students to view their progression through course
- Work Offline/ Synchronize - Upon re-entering a course, the student has the option to resume at the last page viewed.

**Communication Tools**
- Conferencing System: an asynchronous communication medium that gives instructors or moderators the ability to set up collaborative groups easily and to define structures, tasks, and objectives. Example of this tool is widely used forums. In forums participations can post messages, ask questions, present their work. Usually forums are moderated.
- Chat: a real-time (synchronous) communication medium that enables users to chat in “rooms” that they create for the purpose. There are chats with predefined topics and chats that topics can be defined by the participations.
- Whiteboard: includes support for application remote desktop sharing.
- File Exchange – exchange different file types

**Curriculum Design**
- Course Templates: prompt instructors (courseware authors) for relevant information. The tool allows them to create courses without having programming knowledge. Typically this is tool that generate pure html, depending of the selected visual elements.
- Instructional Standards Compliance - Instructional Standard that system support for open data exchange

**Administrative Tools**
- Tools that assist the administrators in installing and maintaining system for example, creating and maintaining accounts, defining access privileges, and establishing courses on the system

**HARDWARE AND SOFTWARE REQUIREMENTS**
Technical requirements of courseware delivery systems (CDS) are defined by educational goals of courseware delivering organization and WEB technology used [4]. Using browsers guarantee that user interface of the system (usually dynamically generated HTML) is platform independent. Performance is slightly dependent of the user computer if server site scripting is used. Some additional software components may be downloaded and installed to expand functionality.

Today’s distributed learning environments are based on multi-tier architecture, including a Web-based application layer and an enterprise database layer accessed from a thin client Web browser. Scalability is addressed through the separation of the application layer from the database layer and user presentation layer, allowing scaling of each component separately. Database scalability is addressed both by the power of the database as well the hardware of the server it is running on. Running through a multiple application server configuration and increasing the performance of each server machine can achieve scalability in the application layer.

Instructional Standards Compliance is an essential part when planning, developing and implementing web based courseware delivery systems. Systems have to provide support for open industry standards for data exchange to enable interoperability, object reusability, and global portability of content. Today most used standards are IMS Learning Design Specification (http://www.imsproject.org/) and SCORM (http://www.altrc.org/).

**CONCLUSIONS**
Design, development, and implementation of successful courseware delivery system should take into account many functional requirements, reflecting pedagogical as well as technological approaches, methods and tools for the improvement of the quality of training
and learning. The system has to be open for modification and accessible by variety of operating systems and browsers. User interface must have appropriate functionality for desired learning or teaching activity for selected target group.

REFERENCES

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