Online Education Terms

This article presents, defines, and discusses the most pivotal online education terms that are used throughout this book. The definitions are presented and discussed in relation to each other, rather than in their alphabetical order.

Online Education, E-learning, and M-learning

Online education: There are many terms for online education. Some of them are: virtual education, Internet-based education, Web-based education, and education via computer-mediated communication (CMC). The following definition of online education is based on Desmond Keegan's (1988) definition of distance education. Hence, online education is characterized by:

- the separation of teachers and learners which distinguishes it from face-to-face education
- the influence of an educational organization which distinguishes it from self-study and private tutoring
- the use of a computer network to present or distribute some educational content
- the provision of two-way communication via a computer network so that students may benefit from communication with each other, teachers, and staff

Sustainable online education is characterized by its ability to persist when extraordinary internal or external funding stops. Unfortunately, it seems to be a rare phenomenon. In most cases online education is sustainable when it generates an economic surplus or reduces costs.

E-learning is here defined as interactive learning in which the learning content is available online and provides automatic feedback to the student's learning activities. Online communication with real people may or may not be included, but the focus of e-learning is usually more on the learning content than on communication between learners and tutors. E-learning could be viewed as an online descendant of *computer-based training* (CBT) and *computer-aided instruction* (CAI).

Unfortunately, the term e-learning is often used as a more generic term and as a synonym for online education. Kaplan-Leiserson has developed an online e-learning glossary, which provides this definition:

E-learning covers a wide set of applications and processes, such as Web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet (LAN/WAN), audio- and videotape, satellite broadcast, interactive TV, and CD-ROM.

The term e-learning is not very precise, and it should be pointed out that learning is just one element of education. So, the term online education should cover a much broader range of services than the term e-learning. One may also claim that e-learning companies often focus on course content, while online education institutions cover the whole range of educational services.

Computer Supported Collaborative Learning (CSCL) focuses on socially oriented theories of learning using computer technologies to support collaborative methods of instruction.

Instructional design is characterized by a systematic and reflective process of applying principles of learning and instruction to develop instructional materials, activities, information resources, and evaluation.

Mobile learning (m-learning): The term m-learning is derived from the term e-learning. It is a form of online learning that can take place anytime, anywhere with the help of a mobile computer device. The device must be capable of presenting learning content and providing wireless two-way communication between teacher(s) and student(s).

Online Education Support Systems

Online education support systems are here defined as all systems that support online education. In the following, this paper discusses two alternative models for online education support systems developed by the author as a part of the Web-edu project. The models are:

- The Jigsaw model for online education support systems
- The Hub model for online education support systems

Both models show that several online education support systems should be integrated or exchange data. This need for integration increases when online education support systems grow from small-scale to large-scale systems. Kaplan-Leiserson touches upon the need for integration in an attempt to define an integrated learning system:

ILS (integrated learning system): A complete software, hardware, and network system used for instruction. In addition to providing curriculum and lessons organized by level, an ILS usually includes a number of tools such as assessments, record keeping, report writing, and user information files that help to identify learning needs, monitor progress, and maintain student records.

To facilitate the increasing need for integration and exchange of data, a number of initiatives have been undertaken to develop standards specifications. Among these initiatives are the IMS project (www.imsproject.org) and SCORM (www.adlnet.org). Much focus has

been given to the specifications' attempts to facilitate exchange of learning content, but the attempts to standardize integration between the various online education support systems could actually be more important. This could be exemplified by the specifications IMS is developing which address key problems and challenges in integration between online education support systems:

- The IMS Learning Resources Meta-data Specifications create a uniform way for describing learning resources so that they can be more easily found (discovered), using meta-data aware search tools that reflect the unique needs of users in learning situations.
- The IMS Enterprise Specification is aimed at administrative applications and services that need to share data about learners, courses, performance, etc., across platforms, operating systems, user interfaces, and so on.
- The IMS Content & Packaging Specification will make it easier to create reusable content objects that will be useful in a variety of learning systems.
- The IMS Question & Test Specification addresses the need to be able to share test items and other assessment tools across different systems.
- The IMS Learner Profiles Specification will look at ways to organize learner information so that learning systems can be more responsive to the specific needs of each user. (www.imsproject.org/faqs/imsnewpage.cfm?number=6)
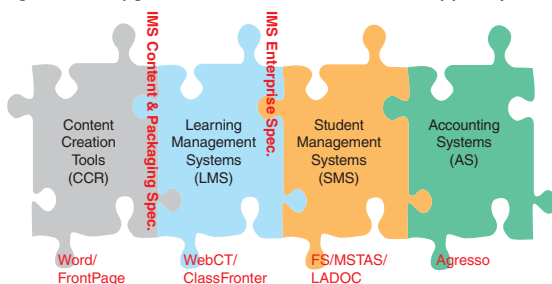
The Jigsaw Model

The Jigsaw model is a simplistic model used in the web-edu project. It includes the four main categories of online education support systems that are listed below and presented in Figure 3.

- Content Creation Tools (CCT)
- Learning Management System (LMS)
- Student Management System (SMS)
- Accounting System (AS)

It is called the Jigsaw model to indicate that these systems should fit together to exchange data more or less seamlessly. Figure 3 also presents some examples of actual systems and shows how the IMS specifications relate to the systems.

Figure 3. The jigsaw model for online education support systems

The Hub Model

The Hub model, presented in Figure 4, is more complex than the Jigsaw model. It is included to show that online education support systems are becoming more and more complex. This is partly due to the institutions' need to rationalize the operation to handle the growing number of online students and courses, and partly due to the fact that users are increasingly expecting more sophisticated services.

The model is termed the Hub Model to indicate that the Student Management System is the central, most important system for large-scale online education. For historical, legal, and financial reasons, the SMS system is the most important system for an educational institution. Hence, all other systems that offer online education services should rely on the SMS system as the master system with which they exchange data.

Figure 4. The hub model for integration of online education support systems
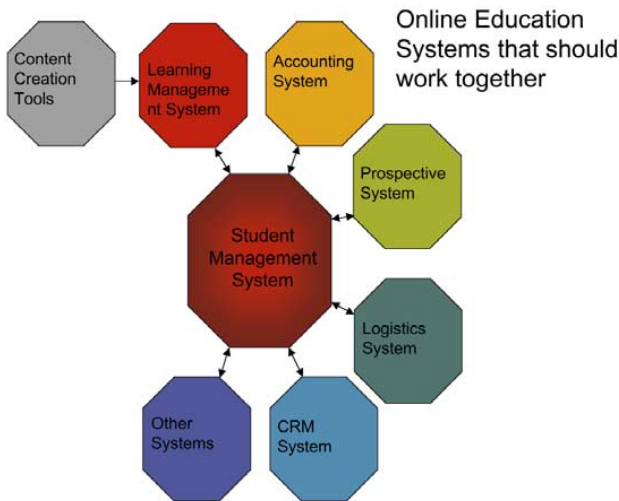
The Hub model includes Customer Relation Management (CRM) systems and prospective systems to show the need for integration with marketing and sales related systems. It also includes logistics systems to show that it could be necessary to integrate systems that handle shipment of textbooks and other physical material to distance students.

Content Creation Tools (CCT)

Content creation tools are the tools that course designers and teachers use to create the content in online education courses. The content creation tools are used to develop learning material. There are many types of content such as plain text, slides, graphics, pictures, animations, simulations, assessments, audio, video etc. Typical examples of these systems are DreamWeaver, FrontPage, Word, PowerPoint, and Director. These are generic tools with few features developed specially for online education.

In addition to the much-used generic CCT tools, there are a number of CCT tools that

are specially made for development of educational content. The most important of these tools are termed *authoring tools* and *assessment tools*.

Authoring Tools

Authoring tools could be regarded as a subset of content creation tools. Hall (2001) defines an authoring tool as "a software application, used by non-programmers, that utilizes a metaphor (book, or flow chart) to create online courses". One may say that authoring tools are content creation tools that are especially developed for creation of educational content.

Assessment Tools

Content related to assignments and assessment is especially important for educators. Therefore, there are various tools available for development of different types of assignments such as for example quizzes and multiple-choice assignments.

Learning Content Management System (LCMS)

Institutions that have a large amount of learning content that they want to use in several courses and various formats may need a Learning Content Management System. Hall (2001) explains a Learning Content Management System this way:

> A learning content management system is an environment where developers can create, store, reuse, manage and deliver learning content from a central object repository, usually a database. LCMS generally work with content that is based on a learning object model. These systems usually have good search capabilities, allowing developers to find quickly the text or media needed to build training content.
>
> Learning Content Management Systems often strive to achieve a separation of content, which is often tagged in XML, from presentation. This allows many LCMS to publish to a wide range of formats, platforms, or devices such as print, Web, and even Wireless Information Devices (WID) such as Palm and Windows CE handhelds, all from the same source material.

An alternative definition is provided by Kaplan-Leiserson:

> LCMS (learning content management system): A software application that allows trainers and training directors to manage both the administrative and content-related functions of training. An LCMS combines the course management capabilities of an LMS (learning management system) with the content creation and storage capabilities of a CMS (content management system).

Learning Object

It is possible to split content in a number of learning objects and reassemble them to create new learning material or courses in the same way you play with Lego blocs. Kaplan-Leiserson explains a learning object as:

> A reusable, media-independent chunk of information used as a modular building block for e-learning content. Learning objects are most effective when organized by a meta data classification system and stored in a data repository such as an LCMS.

Learning Management System (LMS)

Learning Management System is a broad term that is used for a wide range of systems that organize and provide access to online learning services for students, teachers, and administrators. These services usually include access control, provision of learning content, communication tools, and administration of user groups. Another term that often is used as a synonym for LMS is learning platform.

Two examples of well-known, commercial LMS systems are WebCT and Blackboard. There are however a large number of other commercial systems and systems that educational institutions have developed themselves. Kaplan-Leiserson provides the following definition of LMS:

> LMS (learning management system): Software that automates the administration of training events. The LMS registers users, tracks courses in a catalog, and records data from learners; it also provides reports to management. An LMS is typically designed to handle courses by multiple publishers and providers. It usually doesn't include its own authoring capabilities; instead, it focuses on managing courses created by a variety of other sources.

Hall (2001) presents this alternative definition:

> A *Learning Management System* (LMS) is software that automates the administration of training events. All Learning Management Systems manage the log-in of registered users, manage course catalogs, record data from learners, and provide reports to management.
>
> There used to be a distinction between Learning Management Systems and more powerful Integrated Learning Management Systems. That distinction has now disappeared. The term Learning Management System is now used to describe a wide range of applications that track student training and may or may not include functions such as:

■ Authoring
■ Classroom management

- Competency management
- Knowledge management
- Certification or compliance training
- Personalization
- Mentoring
- Chat
- Discussion boards

On the one hand, LMS systems have similarities with the CMC systems (page 33) that started to evolve in the 1980s to support interpersonal communication and collaborative learning. On the other hand, LMS systems also have relationships with instructional design approaches and the early systems for computer-based training. Therefore, it is important to understand that LMS systems may be built on very different pedagogical methods and theories and that these underlying constraints may influence and limit the systems' pedagogical use.

Virtual Learning Environment (VLE)

Virtual learning environment is a term that to some extent is used instead of LMS. The two terms have more or less the same meaning, but one may argue that VLE focusses less on the features related to the management of learning. Bandon Hall (2001) defines a learning environment this way:

> A *Learning Environment* is software designed as an all-in-one solution that can facilitate online learning for an organization. It includes the functions of a learning management system for those courses within the learning environment, but it may not be able to track online courses that were not created within this particular learning environment.
>
> A learning environment is characterized by an interface that allows students to register and take courses, staying within that environment for the duration of the course. The program will usually include some self-instructional portions, along with an academic model of a multi-week course. This model is often facilitated by an instructor, where a group can proceed on a week-to-week basis with seminar assignments. Most learning environments also include an authoring capability for creation of additional courses for the instructor.

Learning Service Provider (LSP)

There are a number of institutions that host Learning Management Systems and provide this as a commercial service for educational institutions. These institutions could be termed Learning Service Providers (LSPs). Kaplan-Leiserson explains the LSP as a specialized Application Service Provider "offering learning management and training delivery software on a hosted or rental basis".

Student Management System (SMS)

The student management system is the core system in an educational institution. It is used for management of the most pivotal information about entities such as students, faculty, courses, applications, admissions, payment, exams, and grades. An effective SMS system is crucial for all educational institutions.

Two examples of commercial SMS systems are PeopleSoft and Banner. In the Nordic countries, universities have national systems such as STADS (Denmark), LADOK (Sweden), MSTAS (Norway), and FS (Norway).

Human Resource Information System (HRIS)

Companies and corporations have employees, not students. But they have systems that hold data similar to the SMS systems with important information about their employees. These could be termed Enterprise Resource Planning (ERP) systems or Human Resource Information Systems (HRIS). These systems will provide some of the same functionalities as student management systems.

Hall (2001) provides the following descriptions of ERP and HRIS systems:

> *Enterprise Resource Planning* (ERP) is an industry term for large, often multi-module software applications that manage many facets of a company's operations including product planning, parts purchasing, maintaining inventories, interacting with suppliers, providing customer service, tracking orders, and managing resources and financials. SAP, PeopleSoft, and J.D. Edwards are some well-known ERP providers.
>
> *Human Resource Information Systems* (HRIS) are similar to ERP applications but are aimed specifically at the management of a company's human resources.

Other names for related systems used in companies could be Knowledge Management Systems or Competency Management Systems. Kaplan –Leiserson defines competency management as follows:

> Competency management: A system used to identify skills, knowledge, and performance within an organization. Enables an organization to spot gaps and introduce training, compensation, and recruiting programs based on current or future needs.

Accounting System (AS)

The accounting system is used for recording the economic transactions between the institution and its customers and suppliers. In an online education setting, the most important customers and suppliers are the students and the teachers.

The data from the accounting systems could be used to deny system access to students who do not pay their tuition fees. Some institutions already accept online enrollment, online

payment, and online student credit account information. Other institutions provide online tutors with their updated salary account information. This functionality requires some integration between the systems.

Online Teaching Terms

The key online teaching terms discussed in this article are presented in Figure 5. In the following, these terms are defined and discussed in a logical sequence with related pivotal terms. The definitions are based on my thesis research (Paulsen 1998).

Figure 5. Mind map of online teaching terms
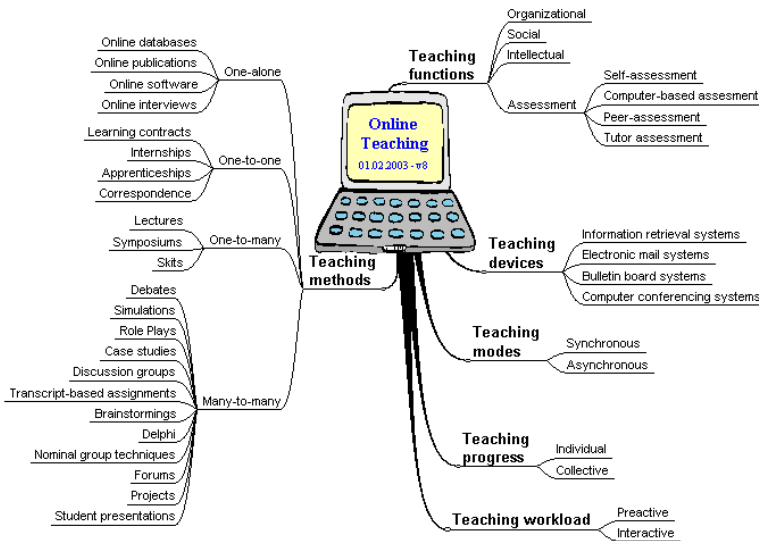
Computer-mediated communication (CMC): Transmission and reception of messages using computers as input, storage, output, and routing devices. CMC includes information retrieval, e-mail, bulletin boards, and computer conferencing. CMC also comprises synchronous and asynchronous communication.

   Information retrieval systems: CMC systems that facilitate searching and retrieval of information. Web pages and search engines have increasingly become the dominant systems.

   E-mail systems (Electronic mail systems): CMC systems that facilitate exchange of messages between individual users.

   Bulletin board systems: CMC systems that facilitate archiving and retrieval of messages posted by originators with write access and retrieved by users with read access.

   Computer conferencing systems: Computer-mediated group communication systems that archive messages so that they can be read and commented on by all members of a conference.

   Push or pull communication. CMC can be based on push or pull technology. In a push system, the sender is in control of the distribution process. In a pull system, the receivers

need to find and retrieve the information. These are systems with different features. Both have their educational benefits and they may have different uses. E-mail is an example of a push system and a bulletin board is an example of a pull system.

Synchronous communication: Real-time communication such as for example online chatting and video-conferencing.

Asynchronous communication: Communication where the message is stored until the receivers find it convenient to retrieve it. E-mail and computer conferencing are examples of asynchronous communication.

Teaching progress: Progress can be individual or collective. Individual progress allows each student to decide when he or she wants to start a course and how fast he or she proceeds through the course. Collective progress imposes a common schedule on all students.

Online teaching system: An online system for teaching comprising learners, one or more teachers, course content, learning resources, teaching methods, teaching techniques, and teaching devices.

Teaching method: A way of organizing people for learning. The teaching methods included here are one-online, one-to-one, one-to-many, and many-to-many.

Teaching technique: A way of accomplishing teaching objectives. According to how the techniques prescribe student interaction with learning resources, the techniques are classified as one-online techniques, one-to-one techniques, one-to-many techniques, and many-to-many techniques.

Teaching device: Tool that can assist the teaching process. This definition distinguishes between these four categories of CMC-based teaching devices: information retrieval systems, e-mail, bulletin boards, and computer conferencing.

Teaching workload: The amount of time spent on teaching functions. The teaching workload consists of the preactive and the interactive teaching workload.

- Preactive teaching workload: Workload associated with program design and teacher preparation, in other words, the teaching workload before the course or program starts.
- Interactive teaching workload: Workload associated with instruction, in other words, the teaching workload after the course or program starts.

Teaching functions: The duties teachers have with regard to the teaching process. This definition distinguishes between organizational functions, social functions, intellectual functions, and assessment functions.

Assessment: The general term used for measuring students' performance on a course against the aims and objectives of that course. In online education, it could be useful to distinguish between *self-assessment*, *computer-based assessment*, *peer assessment*, and *tutor assessment*. All four categories could be used for both formative and summative assessment.

- Formative assessment: The assessment conducted as a part of the teaching: questions and assignments set to help the student learn effectively, but not used to determine the student's course results.

- Summative assessment: The assessment intending to determine a student's overall level of performance on the course: questions and assignments, the grades or scores of which are used in determining the student's course result.

Facilitation technique: A manner of helping others learn. Facilitation techniques are used to carry out teaching functions.

One-online techniques: The techniques classified as one-online are characterized by retrieval of information from online resources and the fact that a learner can perform the learning task with little or no communication with the teacher or other students. One-online techniques include:

- Online databases are organized, searchable collections of information that can be utilized in the learning process.
- Online publications are periodicals, journals, reports, articles, etc., that are available to learners online or distributed to them online.
- Online software applications are software programs that learners either can execute via the network or download from the network.
- Online interest groups are people who convene online to discuss and share experiences on a topic of common interest. Learners can join the online interest group to enhance their knowledge and comprehension of the topic.
- Online interviews are online interactions between learners who ask focused questions and resource people who answer them.

One-to-one techniques: The techniques classified as one-to-one are characterized by a one-to-one relationship and by individualized teaching and learning. The teaching and learning are facilitated in the communication process. So, CMC can be an effective support for these techniques when the communication can be conveyed online. On the other hand, one may contend that some of these techniques depend so much on personal relationships that face-to-face meetings may be necessary.

- *Online learning contracts* are formal agreements which detail what the learners should learn, how they should accomplish it, and the specific evaluation criteria that should be used in judging the completion of the learning.
- *Online apprenticeships* facilitate online access to dedicated masters and peers who are willing to share their knowledge and experience with learners through goal-oriented learning interactions over a period of time.
- *Online internships* allow learners to practice online skills under the guidance and supervision of qualified professionals.
- *Online correspondence* is a form of online education in which the learning is directed or facilitated through personal, written communication between a tutor and individual students.

One-to-many techniques: The techniques defined as one-to-many are characterized by presentation to students by one or more individual experts or by interacting experts. The learners are usually not invited to take active part in the interaction, so the communication is typically conducted in a conference or bulletin board system where students primarily have access to read. The techniques included are lectures, symposiums, and skits.

- Online lectures are organized, in-depth, online presentations that are designed for learning and facilitate online questions from learners and answers from the lecturer.
- Online symposiums are series of presentations given by a number of experts followed by questions from the learners and answers from the experts. The teacher can function as a moderator of the symposium.
- Online skits are prepared enactments in which real or imaginary online people, such as teachers and their alter egos, demonstrate or discuss certain issues or concepts.

Many-to-many techniques: A characteristic of the techniques presented as many-to-many techniques is that all participants have the opportunity to take part in the interaction. The degree of teacher involvement can however vary considerably. Such interaction is the most common application of educational CMC and it can be facilitated in open or closed computer conferences. The techniques discussed are debate, simulation, role-play, case study, discussion groups, transcript-based assignments, brainstorming, delphi technique, nominal group technique, forum, project group, and student presentation.

- Online debates are structured discussions in which the learners argue two or more sides of an important issue to clarify differences and related reasoning within a given set of rules and time schedule.
- Online simulations are online imitations of real processes that are designed to help experience and understand the dynamics of a complex process.
- Online role-plays are enactments of situations in which learners act out scenes like actors in a play. A teacher can use structured role-plays that are based on case studies or spontaneous role-plays that are based on momentary experiences.
- Online case studies are descriptions of real situations that are designed to help the learners understand and practice problem-solving and decision-making procedures in situations that are complex enough to warrant analysis and online discussion.
- Online discussion groups are places where a group of learners exchange ideas on a given topic.
- Transcript-based assignments utilize the ability to provide transcripts of online interaction that could be used to promote learner reflection. This could be done by asking the learners to reflect on their overall personal contributions during the course, or to sum-marize all previous contributions on a specific topic, or to rewrite an early statement to demonstrate that additional learning has taken place during the course.

- Online brainstorming sessions are used primarily to generate a pool of ideas on a given topic or to help determine the exact nature of content to be studied. The approach encourages learners to think creatively and to expand upon ideas of other learners.
- Online delphi is a technique to obtain the most reliable consensus of opinion of a group of experts using a series of intensive questionnaires interspersed with controlled opinion feedback.
- Nominal group technique is based on individual generation and ranking of ideas, followed by a public presentation of the priority ranked list of ideas, a discussion of the presented ideas, and vote for the final ranking.
- Online forums provide teachers and learners with a space where they can convene to raise and discuss issues from the course, make comments, offer information, or ask questions. The teacher usually functions as a moderator.
- Online projects are major tasks, initially loosely defined, which have composite object-ives and are limited in time and scope. Online projects require online communication between the learners in the project groups and access to a variety of online resources.
- Student presentation is a technique in which learners are asked to present their work to other learners via e-mail, computer conferences, Web pages, etc. Feedback from other students is not necessarily required.

Additional Glossaries

The following glossaries are recommended for further information:

- The glossary in the elearningeuropa portal (http://elearningeuropa.info).
- Glossaries of Learning Technologies Terms (http://olt-bta.hrdc-drhc.gc.ca/resources/glossariesx.html) provides links to a number of online glossaries of learning technologies.
- The list of e-learning Glossaries provided by the e-learning Centre (www.e-learningcentre.co.uk/eclipse/Resources/glossaries.htm).
- The Global Distance EducationNet (http://wbweb4.worldbank.org/DistEd/glossary.html) provides a glossary of distance education terms.
- WhatIs (www.whatis.com) provides definitions for thousands of the most current IT-related words.
- Glossaries of Collaborative Technologies Center (www.edb.utexas.edu/resta/itesm2002/glossary.html) is provided by The University of Texas at Austin.

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