The Evolution of e-Learning

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Outline：Any learning occurs with the assistance of an electronic medium to facilitate better learning is so called e-Learning which has received much attention in pass years. This course aims to discuss the issues of evolution and trend for e-Learning including:
  • evolution of e-learning
  • synchronous/ asynchronous e-Learning
  • applications of digital instructional materials
  • on-line learning community
  • mobile learning
  • AI and education
  • trend of e-Learning

Textbook：None

Requirements：
  • Midterm exam + Final exam (50%)
  • Presentation & slides (25%)
  • Term paper (25%)
Introductions to e-Learning

e-Learning

- The e-Learning can be defined as a learning process where digitally delivered content is combined with learning support and services.

- It comprises all forms of electronically supported learning and teaching.

- The information and communication systems, whether networked learning or not, serve as specific media to implement the learning process.
History

- In the early 1960s, Stanford University psychology professors Patrick Suppes and Richard C. Atkinson experimented with using computers to teach math and reading to young children in elementary schools in East Palo Alto, California.

- As early as 1993, William D. Graziadei described an online computer-delivered lecture, tutorial and assessment project using electronic mail.

- Today many technologies are used in e-Learning, from blogs to collaborative software, ePortfolios, and virtual classrooms. Most e-Learning situations use combinations of these techniques.
Virtual education / Virtual school

- Virtual education (school) refers to instruction in a learning environment where teacher and student are separated by time or space, or both, and the teacher provides course content through the use of methods such as course management applications, multimedia resources, the internet, and videoconferencing.

- Students receive the content and communicate with the teacher via the same technologies.
e-Learning Processes

- e-Learning applications include Web-based learning, computer-based learning, virtual education opportunities and digital collaboration.
- Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM.
- It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio.
Higher Education in USA

- Allen and Seamen claim that almost a quarter of all students in post-secondary education were taking fully online courses in 2008.

- A report by Ambient Insight Research in 2009, 44% of post-secondary students were taking some or all of their courses online. It would rise to 81% by 2014.

- e-Learning is moving rapidly to being a predominant form of post-secondary education in the USA.

- The online doctoral programs have even developed at leading research universities.

http://www.usnewsuniversitydirectory.com/doctorate.aspx
K-12 Learning in USA

- There are several states that are utilizing cyber and virtual school platforms for e-Learning across the country that continued to increase.

- Virtual school enables students to log into synchronous learning or asynchronous learning courses anywhere there is an internet connection. Students must meet weekly work submission requirements.

- Cyber schools allow for students to maintain their own pacing and progress, course selection, and provides the flexibility for students to create their own schedule.
e-Learning 2.0

- Conventional e-Learning systems were based on instructional packets, which were delivered to students using assignments. Assignments were evaluated by the teacher.

- The new e-Learning places increased emphasis on social learning and use of social software such as blogs, facebooks, wikis, podcasts (non-streamed webcast) and virtual worlds.

- The term e-Learning 2.0 comes about during the emergence of Web 2.0. Learning takes place through conversations about content and grounded interaction about problems and actions. Social networks have become an important part of e-Learning 2.0.
Web 2.0

- Web 2.0 is associated with web applications that facilitate participatory information sharing, interoperability, user-centered design, and collaboration on the WWW.

- A Web 2.0 site allows users to interact and collaborate with each other in a social media dialogue as creators (prosumers) of user-generated content in a virtual community, in contrast to websites where users (consumers) are limited to the passive viewing of content that was created for them.

- Examples of Web 2.0 include social networking sites, blogs, wikis, video sharing sites, hosted services, web applications, mashups and folksonomies.
Approaches to e-Learning Services

- Computer-based learning
- Computer-based training
- Computer-supported collaborative learning
- Technology-enhanced learning
Computer-Based Learning

- Computer-Based Learning (CBL) refers to the use of computers as a key component of the educational environment.

- While this can refer to the use of computers in a classroom, the term more broadly refers to a structured environment in which computers are used for teaching purposes.
Computer-Based Training

- Computer-Based Trainings (CBTs) are self-paced learning activities accessible via a computer or handheld device.

- CBTs typically present content in a linear fashion, much like reading an online book or manual.

- CBTs offer user-friendly solutions for satisfying continuing education requirements. Instead of limiting students to attending courses or reading printed manuals, students are able to acquire knowledge and skills through methods that are much more conducive to individual learning preferences.
Web-based training

- The term Computer-Based Training is often used interchangeably with Web-based training (WBT) with the primary difference being the delivery method.
  - CBTs are typically delivered via CD-ROM.
  - WBTs are delivered via the Internet using a web browser.
Challenges of CBT/WBT

- Typically the creation of effective CBT/WBT requires enormous resources. The software for developing CBT/EBT (such as Flash or Adobe Director) is often more complex than a subject matter expert or teacher is able to use.

- The lack of human interaction can limit both the type of content that can be presented as well as the type of assessment that can be performed.

- Many learning organizations use smaller CBT/WBT activities as part of online learning program which may include online discussion or other interactive elements.
Computer-supported Collaborative Learning

- **Computer-Supported Collaborative Learning (CSCL)** is one of the most promising innovations to improve teaching and learning with the help of modern information and communication technology.

- Most recent developments in CSCL have been called e-Learning 2.0. The concept of collaborative or group learning whereby instructional methods are designed to encourage or require students to work together on learning tasks.

- It is widely agreed to distinguish collaborative learning from the traditional 'direct transfer' model in which the instructor is assumed to be the distributor of knowledge and skills, which is often given the neologism e-Learning 1.0.
Technology-enhanced learning

- Technology enhanced learning (TEL) focuses on the technological support of any pedagogical approach that utilizes technology.

- TEL has the goal to provide socio-technical innovations (also improving efficiency and cost effectiveness) for e-Learning practices, regarding individuals and organizations, independent of time, place and pace.
The main focus in TEL is on the interplay between learning activities and respective technologies which can range from enabling access to and authoring of a learning resource to elaborate software systems managing (e.g. learning management system, learning content management systems, learning repositories, adaptive learning hypermedia systems, etc.) and managing (human resource management systems; tools for self-directed learning, etc.) the learning process of learners with technical means.
Screencasting

- The recent trend in the E-Learning sector is **screencasting**.
- The web based screencasting tools allow the users to create screencasts directly from their browser and make the video available online so that the viewers can stream the video directly.
- The advantage is that it gives the presenter the ability to show his ideas and flow of thoughts rather than simply explain them, which may be more confusing when delivered via simple text instructions.
- With the combination of video and audio, the expert can mimic the one on one experience of the classroom and deliver clear, complete instructions.

- From the learner's point of view, screencasting provides the ability to pause and rewind and gives the learner the advantage of moving at their own pace, something a classroom cannot always offer.
A learning management system (LMS) is software used for delivering, tracking and managing training/education.

- LMSs range from systems for managing training/educational records to software for distributing courses over the Internet and offering features for online collaboration.

A learning content management system (LCMS) is software for authoring, editing and indexing e-learning content (courses, reusable content objects).

- An LCMS may be solely dedicated to producing and publishing content that is hosted on an LMS, or it can host the content itself.
Asynchronous & Synchronous e-Learning
Asynchronous e-Learning
History of Asynchronous e-Learning

- The roots of asynchronous learning trace their beginnings to the end of the 19th century, when formalized correspondence education (or distance learning) first took advantage of the postal system to bring physically remote learners into the educational fold.

- The 1920s and 30s saw the introduction of recorded audio, desynchronizing broadcasting and revolutionizing the mass dissemination of information.

- The first significant distribution of standardized educational content took place during World War II; the branches of the U.S. military produced hundreds of training films, with screenings numbering in the millions.
Online asynchronous learning began with schools’ and universities’ substantial investment in computer technology in the early 1980s.

As computers entered more households and schools began connecting to the nascent Internet, asynchronous learning networks began to take shape.

These networks augmented existing classroom learning and led to a new correspondence model for solitary learners.

New tools like class blogs and wikis are creating ever richer opportunities for further asynchronous interaction and learning.
Asynchronous e-Learning

- Asynchronous learning is a student-centered teaching method that uses online learning resources to facilitate information sharing outside the constraints of time and place among a network of people.

- The idea here is that participants may engage in the exchange of ideas or information without the dependency of other participants involvement at the same time.

- The online learning resources used to support asynchronous learning include email, electronic mailing lists, videoconferencing systems, online discussion boards, wikis, and blogs.
Course management systems such as CampusCruiser LMS, Blackboard, WebCT, Moodle, and Sakai, have been developed to support online interaction, allowing users to organize discussions, post and reply to messages, and upload and access multimedia.

These asynchronous forms of communication are sometimes supplemented with synchronous components, including text and voice chat, telephone conversations, videoconferencing, and even meetings in virtual spaces such as Second Life, where discussions can be facilitated among groups of students.
Development of an Asynchronous Community

- The social relationships integral to group learning can be developed through asynchronous communication.
- The establishment of an asynchronous learning community tends to follow five stages:

  1. **Introductions** - Through this step, community members begin to see one another as human beings and begin to make a preliminary, emotive connection with the other members of the community.

  2. **Identify with the group** - Members begin to communicate with one another by reference to their commonalities as group members and seek to either establish or make known norms for successful membership.
3. **Interact** - Members will start interacting with one another in reference to the community's established focus and begin to share information with one another. Students will begin to discuss course content.

4. **Group cohesion and individual reflection** - Members will begin to validate one another's ideas and opinions while, at the same time, being reflective of their own.

5. **Expansive questioning** - Now feeling comfortable within the environment, focused upon the content, and respectful of other group members' thoughts and experiences, members will begin to not only post facts and deeply-held beliefs, but will actually start to 'think out loud,' allowing other group members to take part in their personal meaning-making and self-directed inquiry.
Common Attributes of Asynchronous Communities

Asynchronous communities that progress efficiently through five stages tend to share at least three common attributes:

First, the community has an active facilitator who monitors, guides, and nurtures the discourse.

Second, rather than seeking to take on the role of an instructor of knowledge, the facilitator recognizes that knowledge is an individual construct that is developed through interaction with other group members. Thus, facilitators within successful communities tend not to be pedantic, but supportive.

Third, successful asynchronous communities permit a certain amount of leniency for play within their discourse.
Roles of Instructors

- Asynchronous e-Learning demands that instructors become instructional designers, facilitators, and assessors of both grades and their teaching methods.

- As instructional designers, emphasis is placed on establishing the curriculum, methods and the media through which the content will be effectively delivered.

- Once the design is in place and executed, the instructor must then facilitate the communication and direct the learning. Establishing a communal spirit is vital, the instructor must spend time reading, assessing, reinforcing, and encouraging the interaction and learning happening.
Roles of Learners

- The student-centered nature of asynchronous online learning requires students to be actively involved with and take more responsibility for their own learning.

- In addition to their normal duties as learners, students are required to:
  - become proficient with the technology required for the course;
  - use new methods of communication with both peers and instructors;
  - strengthen their interdependency through collaboration with their peers.
Advantage of Asynchronous e-Learning

- Students can access the course and its instructional materials at any time they choose and from any location with an Internet connection.

- Its environments provide a “high degree of interactivity” between participants who are separated both geographically and temporally and afford students many of the social benefits of learning interaction.

- Students have more time to reflect on and respond to class materials and their classmates than in a traditional classroom.
Most asynchronous courses have the potential to reach far more students than a traditional course and course-wide updates or modifications can be disseminated far more quickly and efficiently than traditional lecture models.

Participants can go back and review course materials, lectures, and presentations, as well as correspondence between participants.
Disadvantage of Asynchronous e-Learning

- Course development and initial setup can be costly.
- Institutions must provide a computer network infrastructure, including servers, audio/visual equipment, software, and the technical support needed to develop and maintain asynchronous learning environments.
- Technical support includes initial training and setup, user management, data storage and recovery, as well as hardware repairs and updates.
- Students must also have the computer/technology skills required to participate in the asynchronous learning program.
Synchronous e-Learning
Synchronous Learning / e-Learning

- **Synchronous learning** refers to a group of people learning the same things at the same time in the same place. This is the type of pedagogy practiced in most schools.

- **Synchronous e-Learning** is synchronous learning that takes place through electronic means. It is live, real-time, interactive, electronically-enabled learning.

- Synchronous e-Learning sessions can usually be recorded and played back, but that’s not their primary strength or purpose.
Synchronous e-Learning

- Synchronous e-Learning goes by a variety of names: virtual classrooms, Web conferences, Webinars (Web Seminars), and online presentations.

- What all of the descriptions have in common is the use of Web conferencing software to support live, interactive learning events delivered on the World Wide Web.

- It is only from around 2001 that organizations and individuals have had the technology, the infrastructure, and the bandwidth to make it practical for widespread adoption.
Synchronous e-Learning Technologies

- The report on 2005 indicated that about 90% of respondents had participated in a synchronous e-Learning event.

- Categories of synchronous e-Learning technologies –
  - Teleconferencing
  - Webcasting
  - Gaming and simulations
  - Web conferencing
Teleconferencing

- Audioconferencing
  - Also known as conference calling, this is audio-only interaction via telephone.
  - Audioconferences are often used in association with other delivery means (such as sending out slides and materials through e-mail).

- Videoconferencing
  - Video and audio data signals are transmitted over high speed dedicated telephone lines (ISDN model), or over the Internet (IP model).
  - Its full screen video and high audio quality make it the form that most closely emulates the face-to-face experience and human co-presence.
Webcasting

- Webcasting as a term was derived from the concept of broadcasting over the Web. As this etymology implies, the expression originally referenced audio and video sent from a single source to multiple passive receivers, either live or on demand.

- The largest "webcasters" include existing radio and TV stations, who "simulcast" their output, as well as a multitude of Internet only "stations".

- The term webcasting usually refers to non-interactive linear streams or events.
Gaming and Simulations

- Online virtual environments or challenges that respond and dynamically adjust to learner input.
- It is advancing rapidly and has strong support from those who advocate the myriad benefits of verisimilitude, immersive learning environments and “realistic” problem-based scenarios.
- Sophisticated games and simulations are particularly appearing to high risk industries and occupations (such as aviation, financial services, military, law enforcement, and medicine), where the potential fiscal and health dangers associated with an unskilled workforce are especially high.
Web conferencing

- When people discuss “synchronous e-Learning,” they are typically referring to Web conferencing which is highly interactive Internet-based application.
- Web conferencing technologies offer tremendous potential for robust interactivity and collaboration through their versatility and rich feature options.
- Web conferencing permits learners to easily share ideas and experiences, ask follow-up questions, and participate in practice exercises and case study discussions.
- It also carries numerous secondary benefits, such as community building and networking.
Trend of Synchronous e-Learning

- The synchronous technologies are currently undergoing significant convergence and redefinition.
- Telephony and audioconferencing services are moving to Voice over Internet Protocol (VoIP) handsets, at the same time that many Web conference services are offering gateway integration between VoIP and regular PBX/PSTN telephony.
- Mobile devices are rapidly adding features that exploit their visual interfaces, larger memories and higher bandwidth cellular networks, indicating that videoconferencing and Web conferencing integration is close at hand for the mobile learner.
Synchronous e-Learning Systems

- HomeMeeting WebOffice (JoinNet)
- CISCO Webex
- Macromedia BREEZE Live
- ORACLE iMeeting
- MS Live Communication Server
- IBM Lotus Instant Messaging and Conferencing (Sametime)
- Arel Spotlight Application Suit and ICP
Advantages of Synchronous e-Learning

- Immediate interaction and feedback from live instructors and Subject Matter Experts (SMEs)
- Collaboration and social learning with other learners
- Reduced travel costs
- Reduced time away from work or home
Disadvantages of Synchronous e-Learning

- Technical problems with hardware, software, set-up, or connections
- Too little learner engagement or interactivity
- Facilitators are not usually skilled in synchronous remote delivery techniques
- Bandwidth limitations
## Synchronous vs. Asynchronous e-Learning

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<th>Distinctive Features</th>
<th>Synchronous e-Learning</th>
<th>Asynchronous e-Learning</th>
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<tr>
<td>✓ Real-time</td>
<td>✓ Live</td>
<td>✓ Intermittent access or interaction</td>
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<td>✓ Usually scheduled and time-specific</td>
<td>✓ Simultaneous virtual presence (with other learners and facilitators or instructors)</td>
<td>✓ Self-paced</td>
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<td>✓ Concurrent learning with others</td>
<td>✓ Independent learning</td>
<td>✓ Usually available any time</td>
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<td></td>
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<td>✓ Recorded or pre-produced</td>
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<th>Examples</th>
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<td>✓ Instant messaging</td>
<td>✓ Online chat</td>
<td>✓ E-mail</td>
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<td>✓ Live Webcasting</td>
<td>✓ Audioconferencing</td>
<td>✓ Threaded discussion</td>
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<td>✓ Videoconferencing</td>
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<td>✓ Computer-based training</td>
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Blended Learning

- **Blended learning** refers to a mixing of different learning environments. It combines traditional face to face classroom methods with more modern computer-mediated activities.

- The strategy creates a more integrated approach for both instructors and learners.

- Formerly, technology-based materials played a supporting role to face-to-face instruction. Through a blended learning approach, technology will be more important.

- Blended learning is also described as “integrative learning”, “hybrid learning”, “multi-method learning.”
Applications of Digital Instructional Materials
Instructional Material

- Instructional material means all materials that are designed for use by students and their teachers as a learning resource and help students acquire facts, skills, or opinions or develop cognitive processes.

- Instructional material may be printed or non-printed, and may include textbooks, technology-based materials, other educational materials, and tests. This includes Web-based and electronic textbooks.

- Technology-based materials require the availability of electronic equipment in order to be used as a learning resource which includes software programs, video, audio, lesson plans, and databases.
Digital Instructional Material

- Digital Instructional material means computer-based applications or software, which are especially made for specific learning or educational purposes.

- The same issue of digital instructional material are, e.g., digital learning materials, digital pedagogical resources, educational applications, or educational software.
Classification of Digital Instructional Materials

- **Software packages** -- also called as Computer-Aided Instruction (CAI) programs, which are usually delivered by CD-ROMs. Examples of such software are drill-and-practice programs, tutorials, educational games, simulations, virtual realities, or hypermedia and multimedia learning environments.

- **Web-based material** -- such as web sites deliberately developed for educational purposes, and web-based courseware.

- **Learning objects/components** -- is a collection of content items, practice items, and assessment items that are combined based on a single learning objective.
Learning object

- 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.

- Key characteristics of learning object:
  - Learning objects are a new way of thinking about learning content. Traditionally, content comes in a several hour chunk. Learning objects are much smaller units of learning, typically ranging from 2 minutes to 15 minutes.
  - Are self-contained – each learning object can be taken independently.
- Are reusable – a single learning object may be used in multiple contexts for multiple purposes.
- Can be aggregated – learning objects can be grouped into larger collections of content, including traditional course structures.
- Are tagged with metadata – every learning object has descriptive information allowing it to be easily found by a search.

- Learning object design raises issues of portability, and of the object's relation to a broader learning management system.
Digitizing of Instructional Material


# Utilization of Document Tools

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<td>MS FrontPage</td>
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<td>Learning Content Management System (LCMS)</td>
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<td>18%</td>
<td>Content Authoring Tools built into LMS</td>
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<td>16%</td>
<td>Others</td>
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<tr>
<td>13%</td>
<td>Rapid e-Learning Tools</td>
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Reference: Brandon-hall.com
MIT OpenCourseWare

- **MIT OpenCourseWare** (MIT OCW) is an initiative of the Massachusetts Institute of Technology (MIT) to put all of the educational materials from its undergraduate- and graduate-level courses online, partly free and openly available to anyone, anywhere.

- The project was announced in October 2002 and adopts Creative Commons (Taiwan) Attribution-Noncommercial-Share Alike license.

- As of December 2010, over 2035 courses were available online.
The initiative has inspired a number of other institutions to make their course materials available as open educational resources.

In 2005, MIT OpenCourseWare and other leading open educational resources projects formed the OpenCourseWare Consortium, which seeks to extend the reach and impact of open course materials, foster new open course materials and develop sustainable models for open course material publication.

The annual cost of running MIT OCW is about $3.5 million per year.
Technology of MIT OCW

- MIT OCW was originally served by a custom content management system based on Microsoft's Microsoft Content Management Server, which was replaced in mid-2010 with a Plone-based content management system. (Plone is a free and open source content management system.)

- Video content for the courses are primarily in RealMedia format. Though the default videos provided are meant to be streamed from the MIT server, they are also provided in full for offline downloads in iTunes. Many course videos are also available on Youtube. Also, an iPhone App called LectureHall was created.
OpenCourseWare in the World

- Massachusetts Institute of Technology
- Bloomberg School of Public Health, Johns Hopkins University
- Utah State University
- Tufts University
- University of Tokyo
- National Chiao Tung University
- OpenCourseWare Consortium
- Taiwan OpenCourseWare Consortium
OOPS in Taiwan

- Opensource Opencourseware Prototype System (OOPS) is a project start in 2004 by Foundation of Fantasy Culture and Arts at Taiwan.
- Fantasy Foundation is also MIT OCW’s official translation affiliate.
- OOPS is a grass roots effort to localize MIT's OCW into Chinese.
- OOPS supports a volunteer effort in widening access to world-class knowledge for the Chinese-speaking population around the globe.
SCORM

- **Sharable Content Object Reference Model (SCORM)** is a collection of standards and specifications for web-based e-learning.

- SCORM is a specification of the Advanced Distributed Learning (ADL) Initiative, which comes out of the Office of the United States Secretary of Defense.

- Among SCORM goals are to enable interoperability, accessibility, reusability and durability of web-based learning content for industry, government, and academia.
SCORM defines communications between client side content and a host system called the run-time environment, which is commonly supported by a learning management system.

SCORM also defines how content may be packaged into a transferable ZIP file called "Package Interchange Format".

Reference: http://scormsoft.com/scorm
Specifications of SCORM

- Content Aggregation Model (CAM) — describes how SCORM content packages are structured and described.

- Run-Time Environment (RTE) — describes runtime API and data model used for communication between content objects and learning management systems.

- Sequencing and Navigation (SN) — describes how content packages declare sequencing between activities, how learners can issue navigation requests, and how those requests are interpreted by a SCORM run-time environment.
SCORM Content Aggregation

- How do I make my existing e-learning content SCORM conformant?

- Content is generally compatible with SCORM if:
  - It can be delivered via a web browser
  - It can be self-contained (i.e. packaged with all dependencies wholly in a ZIP file)
  - It does NOT depend on server-side scripting languages (such as JSP, ASP, and PHP)
  - It does NOT depend on external files or external URLs
  - It does NOT depend on downloadable components that must be installed by an administrator
General steps for making e-learning content SCORM conformant:

- Ensure content meets SCORM compatibility requirements
- Organize all content files (including dependencies) into a single directory structure
- Define and describe the content using an XML manifest file as described by SCORM
- Package all the content and necessary files into a ZIP file

SCORM conformant e-learning content can be packaged, deployed to, and delivered via any SCORM conformant learning management system.
The RTE handles requirements for launching content objects, establishing communication between LMSs and shareable content objects (SCOs), and managing the tracking information that can be communicated between SCOs and LMSs.

The RTE launch process provides a common way to deliver web-based content objects to learners.

The launch process defines procedures and responsibilities for the establishment of communication between launched content objects and the run-time environment.
**SCORM Sequencing and Navigation**

- Sequencing defines the behaviors and data model used by the SCORM run-time environment to determine how a content package will be delivered as a learning experience.

- Navigation defines how learning and system-initiated navigation events are triggered and processed, resulting in the identification of learning activity for delivery.

- SN define the ability of a learner to navigate from one learning object to another and the sequence in which learning objects may be experienced by a learner.
SCORM Timeline

- January 1999 — Executive Order 13111 signed tasking the DoD to develop common specifications and standards for e-learning across both federal and private sectors.
- January 2000 — SCORM Version 1.0
- January 2001 — SCORM Version 1.1
- October 2001 — SCORM Version 1.2
- June 2006 — Department of Defense Instruction (DoDI) 1322.26 Requiring DoD Use of SCORM
- October 2006 — SCORM 2004 (3rd Edition)
SCORM 2004

- SCORM 2004 introduced a complex idea called sequencing, which is a set of rules that specifies the order in which a learner may experience content objects.

- In simple terms, they constrain a learner to a fixed set of paths through the training material, permit the learner to "bookmark" their progress when taking breaks, and assure the acceptability of test scores achieved by the learner.
The standard uses XML, and it is based on the results of work done by

- AICC (Aviation Industry CBT Consortium)
- ADL (Advanced Distributed Learning initiate)
- IEEE LTSC (Learning Technology Standards Committee)
- IMS (Instructional Management Standards) Global Learning Consortium
- ASTD (American Society for Training & Development)
On-line Learning Community
What is online learning community?

- An online learning community is a public or private destination on the Internet that addresses the learning needs of its members by facilitating peer-to-peer learning.

- Through social networking and computer-mediated communication, people work as a community to achieve a shared learning objective.

- In an online learning community, people share knowledge via textual discussion (synchronous or asynchronous), audio, video, or other Internet-supported mediums.
Categories of Online Learning Communities

- Types of online learning communities include e-learning communities (groups interact and connect solely via technology) and blended learning communities (groups utilize face-to-face meetings as well as online meetings).

- Online learning communities may be categorized as knowledge-based, practice-based, and task-based.

- Online learning communities may focus on personal aspects, process, or technology.
Online learning communities may use technology and tools in many categories:

- synchronous (such as instant messaging)
- asynchronous (such as message boards and Internet forums)
- blogs (such as Blogger (service))
- course management (such as Alphastudy, Dokeos, eFront, elearnapp, Claroline, Moodle, Chamilo or Lectureshare)
- collaborative (such as wikis)
- social networking (such as Del.icio.us and Flickr)
- social learning (such as Bloomfire and Wisetail)
Indicators when community formed

- The indicators when community has formed include evidence of the following:
  - Active interaction involving both course content and personal communication
  - Collaborative learning evidenced by comments directed primarily student to student rather than student to instructor
  - Socially constructed meaning evidenced by agreement or questioning, with the intent to achieve agreement on issues of meaning
  - Sharing of resources among students
  - Expressions of support and encouragement exchanged between students, as well as willingness to critically evaluate the work of others.
The online learning community in an online course allows for mutual exploration of ideas, a safe place to reflect on and develop those ideas, and a collaborative, supportive approach to academic work.

Many researches believe that community is the vehicle through which online courses are most effectively delivered regardless of content.
5 Phases for Knowledge Construction

- The online learning community socially constructs knowledge, using collaboration and reflection, going through five phases:

1. The first phase involves sharing and comparing information. This is the time early in the formation of the group where participants test each other out, as it were, to determine what strengths and knowledge each brings to the group.

2. The second phase involves the discovery of areas of potential disagreement, dissonance, or inconsistency of ideas. At this phase, members of a group might enter into conflict with one another. The conflict helps to further develop the group and allows for the give-and-take necessary to the meaningful creation of knowledge.
3. In the third phase, the negotiation of meaning begins to occur.

4. Phase four sees the group testing their new synthesis of ideas against fact to fact, in this case, may be what is being presented in the text and readings for the course or may be what the participants have experienced in their daily lives.

5. Phase five, then, is illustrated by the emergence of meta-cognitive statements on the part of students that illustrate that their thinking on the topic has changed.
Through the five phases can help the group achieve learning outcomes, attain higher levels of thinking, promote satisfaction with the learning experience, and solidify the sense of community the group has formed.

By learning together in a learning community, students have the opportunity to extend and deepen their learning experience, test out new ideas by sharing them with a supportive group, and receive critical and constructive feedback.

Learning community reduces the potential for learner isolation that can occur in the online environment.
Creating and Sustaining Community

- Clearly, simple participation in an online course is not enough to create and sustain an online learning community.

- Students need to be invited and encouraged to join the community and then, through good modeling by the instructor about what it means to learn in community, be encouraged to gradually take on the responsibility for sustaining it.

- Designing a course with collaboration and reflection in mind helps to move the group through the phases of knowledge development and solidifies the sense of community.
Courses need to be designed with community in mind. Beginning course with students post introductions, engage in an ice breaker activity, review and discuss course guideline, and discuss what they hope to learn in the course.

Once the course begins in earnest, other means of continuing to support and sustain the developing community include collaborative learning activities, such as WebQuests, fishbowls, jigsaw activities, small group activities, and the like, as well as the use of blogs, wikis, and facebooks.
Operating Learning Community

1. *Test the water* – exam the possibility to form the community.
2. *Make it a party* – let all members involve.
3. *Have them waiting at the door* – learner like to join.
4. *Use your entire site to seed discussions* – encourage discussion.
5. *Recruit help* – recruit members who like to help.
7. **Remember it’s their community, too** – the community is belong to every member.

8. **Project personality** – community has own style.

9. **Grow carefully** – let community carefully grow.

10. **A skillful moderator** – to be a good intermediary
Collaborative Learning

- Collaborative learning is a situation in which two or more people learn or attempt to learn something together.

- People engaged in collaborative learning capitalize on one another’s resources and skills (asking one another for information, evaluating one another’s ideas, monitoring one another’s work, etc.).

- More specifically, collaborative learning is based on the model that knowledge can be created within a population where members actively interact by sharing experiences and take on asymmetry roles.
Online Collaborative Learning

- Online collaboration, in the form of peer work groups and learning communities, increases engagement in the learning process.

- Collaborative construction of knowledge through social negotiation of results in greater understanding.

- Helping to form social bonds with peers, increasing academic motivation and participation, improving self-concept and self-awareness and, potentially, having a positive impact on achievement are some of the benefits of online collaborative learning.
Community Collaboration

- The successful achievement of learning objectives and achieving course competencies increases through collaborative engagement.
- The collaborative acquisition of knowledge is one key to the success of creating an online learning environment.
- The evolved model of online community that relies on a cycle of collaboration and community – building and constructed around the notions of social presence, and the use of an online learning community to achieve successful outcomes.
### Top 100 Tools for Learning 2010

List compiled from the Top 10 Tools contributions of 545 learning professionals worldwide.

<table>
<thead>
<tr>
<th>TOOL Name</th>
<th>Platform</th>
<th>Cost</th>
<th># Votes</th>
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<td>F</td>
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</table>
Tools to Build an Online Learning Community

- Top 100 tools for learning 2011 voting.

- Individual tools
  - Blogs
  - Collaboration tools (e.g. Wikis)
  - Public & private social networking site
  - Social learning platforms

- Organisational tools
  - Course management tools
  - Social and collaboration platforms
Short Video for Online Learning Community

- What an online learning community means to me.
Mobile Learning
Mobile

- According to a recent report (2011) from mobile manufacturer Ericsson, studies show that by 2015, 80% of people accessing the Internet will be doing so from mobile devices. (The Horizon Report 2011)
- Perhaps more important for education, Internet capable mobile devices will outnumber computers within the next year.
- This shift in the means of connecting to the Internet is being enabled by the convergence of three trends: the growing number of Internet-capable mobile devices, increasingly flexible web content, and continued development of the networks that support connectivity.
Mobile for Teaching

- Mobiles allow very simple tools to be easily integrated into classroom activities with no need for involvement of IT or support staff.

  **Twitter**, a short-message microblogging service that is very easy to use on phones, is commonly used as an in-class discussion tool. Students participate by sending messages to ask and answer questions or expand on thoughts.

  **Poll Everywhere**, turns mobiles into personal response systems, enabling teachers to quiz students, assess their understanding before, during, and after a lesson, and reveal patterns of thinking in the classroom.
Mobile Learning (M-Learning)

- **M-Learning**: Any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies.

- Mobiles enable ubiquitous access to information, social networks, tools for learning and productivity, and much more.

- M-Learning is an emerging, and rapidly expanding field of educational research and practice across schools, colleges and universities as well as in the work place.
M-Learning is also gaining increasing importance in what is frequently referred to as ‘informal’ (as opposed to ‘formal’) learning and it is starting to attract the interest and imagination of practitioners in all phases of education as well as that of researchers.

Mobile devices to support M-Learning can be smartphone, MP3 player, laptops and tablets.
Teaching The Mobile Generation

Devices:
- Tablet PC
- MP4 player
- Netbook
- Smartphone
- E-reader
M-Learning involves the exploitation of ubiquitous handheld hardware, wireless networking and mobile telephony to facilitate, support, enhance and extend the reach of teaching and learning.

Digital cameras, gaming consoles, and standard mobile phones also can be used in informal, ‘on the go’ learning, and also in more formal learning situations.
M-Learning Scenarios

- People are using mobile devices to help their informal, out of class language learning: (by Nicky Hockly)

Teaching The Mobile Generation

- Grammar podcasts while training
- Access my online course Moodle
- Send my Austrian girlfriend
- Farsi & Hindi on iTouch
- French TV news vodcasts
- Japanese dictionary
Going clockwise from the top of the slide:

- A teaching colleague in the UK is starting to learn Hindi and Farsi on his iTouch. He uses flashcard apps to help him memorise vocabulary, on his way to work on the London underground.

- I am currently studying French. We use no authentic audio or video materials in the classes, so I subscribe to video podcasts from a number of French TV stations, and watch the news every night on my iPhone on the sofa, at a time that suits me.

- A British teaching colleague who recently moved to Japan uses a Japanese/English dictionary on his iPhone to check any new words he comes across while walking around Tokyo.
- A UK colleague’s son recently met an Austrian girl last summer, and continues the relationship mainly via SMS. His German has improved remarkably.

- We had a participant from the Maldives, who completed one of our online training courses in Moodle (a learning system), completely from his Nokia phone.

- A friend here in Spain who is learning English listens to grammar podcasts in his iPod while training for marathons. He is especially fond of the BBC’s Grammar Challenge podcasts, he says.
Characteristics of M-Learning

**Mobility:** Mobile devices can be taken anywhere and access to the information readily.

**Ubiquity:** Mobile devices have a very high penetration rate throughout the world, and have evolved into much more than just phone.

**Accessibility:** All the information on the Internet is available at a moment’s notice. This has allowed us to augment our experience in the world with additional information when needed.
**Connectivity:** Global social networking and communications make it easy to be in touch with anyone around the world who has access to a mobile device. This makes collaboration using mobile devices possible.

**Context sensitivity:** Mobile devices can sense the user’s location and orientation, and thereby know his or her environment. They can also sense the time and store information about the characteristics of the user.
**Individuality:** Because mobile devices are personal, mobile learning can be individualized to the needs of each learner.

**Creativity:** Highly capable mobile devices can serve as content generation platforms, allowing the mobile learner to create and contribute to mobile learning materials.
Mobile Learning Ecosystem

- The network mobile technology system that supports mobile learning is a complex mix of multiple forms of mobility, many different mobile technologies, a diversity of carriers, a variety of learners, a multitude of learning contexts, teachers with all levels of experience with mobile learning, and many approaches to the design of mobile content and teaching methods.

- To understand this complex system, it helps to think of it as a mobile learning “ecosystem” made up of people embedded in a particular cultural context using mobile technologies on a network to access or store information as part of a learning experience.
Mobile computing is a set of rapidly changing technologies. Probably 80% of current mobile technology, architecture, platform and vendor choices will become obsolete in five years, (Nick Jones, 2009)

There are more than 5,000 different mobile devices in the world, running at least 30 different Web browsers, on a variety of networks controlled by large companies known as “carriers.”

This messy situation is exacerbated by the fact there are no real standards for the development of mobile computing or mobile learning.
Elements of a M-Learning Ecosystem

Possible Elements of a Mobile Learning Ecosystem

**DEVICES**
- Smartphones
- Personal digital assistants
- Barcodes
- Digital cameras
- Optical tag readers
- Tablet computers
- Haptic devices
- Biofeedback
- iPods
- RFID
- Internet radio
- Gesture recognition
- Location sensing devices
- Retinal projectors
- Analog cellular telephony (1G)
- Digital mobile communication (2G)
- Wideband mobile communication (3G)
- Broadband fourth generation networks (4G)
- GSM—global system for mobile communications
- TDMA—Time division multiple access

**CONTENT**
- Messages—SMS
- Interactive messaging
- Voice-based content
- Rich media
- Assessments
- Reference materials
- Courseware
- Immersive media
- Information sources
- Symbian
- iPhone
- BlackBerry
- Linux

**PLATFORMS**
- Windows Mobile
- Palm
- Google Android

**INFRASTRUCTURE**
- CDMA—code division multiple access
- UMTS—universal mobile telecommunications system
- LTE—Long term evolution (4G)
- Mobile network operators
- Mobile virtual network operators
- Mobile phone retailers

**TOOLS**
- .Net/C#
- C++ or JavaVM
- Java
- Objective C
- WML
- WebOS
- Adobe Flash for mobiles
- VoiceXML
- CTAD
- Captasia
- Captivate
- XHTML
- Dreamweaver
- Articulate
- Chalk Pushcast
- Acrobat
- HTML
- Impatica
- Intuition
- Giunti Mobile
- PowerPoint

**CONCEPTS**
- Augmented reality
- The Internet of things
- Near field communications
- Individual addressability
Mobile Network Infrastructure

- Generations of Mobile Networks
  - Analog Cellular telephony (1G) – 1980s.
  - Digital mobile communication (2G) – 1991.
  - Wideband mobile communication (3G) – 2001, voice telephone, mobile Internet access, video calls and mobile TV; peak data rates at least 200 kbit/s.
  - Broadband fourth generation networks (4G) – 2009, peak speed requirements at 100 Mbit/s for high mobility communication (such as from trains and cars) and 1 Gbit/s for low mobility communication (such as pedestrians and stationary users).
  - 5G were standardized in 2011, not officially used yet.
Mobile Operating Systems – the most common used are:

- **Android** from **Google Inc.** (open source, Apache)
- **BlackBerry OS** from **RIM** (closed source, proprietary)
- **iOS** from **Apple Inc.** (closed source, proprietary)
- **Symbian OS** from the **Symbian Foundation** (open public license)
- **Windows Phone** from **Microsoft** (closed source, proprietary)
- **webOS** from **HP** (certain parts open sourced)
- **bada** from **Samsung Electronics** (closed source, proprietary)
Share of worldwide 2011 Q2 smartphone sales to end users by operating system, according to Gartner.

Reference: wikipedia
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Context Awareness

- Context awareness refers to trainers being aware of what is going on around the learner in order to provide learners with the most relevant information and activities for learning.

- Traditional education and training tries to reduce contexts and standardize the environments for learning.

- Contextual learning does the opposite – it uses the changing contexts to increase the opportunities for learning.
Context-Aware Computing
Mobile Learning Context

- In designing for mobile learning, one of the first tasks is to recognize what form of mobility is involved.

- Mobile learning can mean learning from a mobile device. It can also refer to anyone who is moving through an environment and is connected to the information cloud via ubiquitous technologies such as digital signage, information kiosks, RFID tags, bar codes, or always-on wearable computing devices.

- Identifying the type of mobility is first step that will shape the direction to take for the many design decisions that follow.
In order to design effective mobile learning, we must thoroughly understand the end users. Defining and evaluating a variety of human factors includes:

- **Locations and settings**: Where will the mobile learning activities take place? Under what conditions of lighting, noise, weather, obstacles, and social environment will the learner interact with his or her mobile device?

- **Movement and posture**: Will the learner be moving while learning? Will he or she be sitting, standing, or walking?

- **Devices and usages**: How will the learner operate the mobile device? Will he or she be using one hand, two hands or a stylus, finger, keyboard, numeric pad, or touch screen.
- **Workloads, distractions, and activities:** Is the carrying of a device for mobile learning critical to the person’s functioning in the job? Does it enhance productivity and effectiveness? Or, is it a distraction from what the person needs to do?

- **Users and personas:** What are the special characteristics of the users who will be undertaking mobile learning? What about accessibility for people with disabilities? Have you worked out a set of typical users (personas) for the deployment of mobile learning in your company?

- The above human factors refer to the usability for the end users.
Optimizing the Usability

- Some points for optimizing the usability of handheld devices:
  - **Handhelds excel at perceived speed:** A mobile device must be quick to use.
  - **Too many features frustrate customers:** Mobile technologies need to be quick to learn and easy to use.
  - **A handheld device must be easy to carry and not require frequent recharging:** Loading lots of features can make a mobile device bigger and heavier, thus shortening battery life.
  - **Handhelds are about the user:** What count is the user experience, not a list of features.
- **Handhelds must be wearable:** Mobile devices must be more than just portable. They must be so small and light that a person can carry one everywhere, in a pocket or a purse, without even thinking about it.

- **Handhelds are used frequently but briefly:** People generally use mobile devices in frequent, short bursts. In fact, the usage patterns of handhelds are exactly the opposite those of PCs. Therefore, taking similar approaches to product design is a fundamental mistake.
Use Cases for Mobile Workers

- Use case scenarios work out will be using the mobile learning solution and how they will be using it.
  - **Road Warriors** – Connecting your outside sales professionals and field technical team whose jobs keep them at the “front line” of your business.
  - **Commuters & Business Travelers** – Making training/development available whenever and wherever your workers have the time and need.
  - **Factory/Warehouse Employees** – Facilitating new ways to take ongoing and just in-time training “out of the classroom and onto the shop floor” using portable, low cost, and easy to support mobile devices.
Partners, Contractors & Vendors – Enabling consistent training and information delivery of your organization’s policies, procedures and practices as well as facilitating data gathering from diverse sources.

New Hires & Matriculants – Providing first round company overviews to applicants-in-process and new hires even connecting from home using their telephone or cell phone.

The real purpose of understanding user needs is to take action that will improve the likelihood of employees adopting new learning technologies.
M-Learning Content Sources

- In the past, teachers and instructors were sources of information, the learning materials that instructors wanted to learners to read, listen to, or review.

- Current M-Learning is more about creating learning experiences-activities that are engaging and challenging and that result in significant changes to knowledge and behavior, or about providing online resources that learners can find without the intervention of an instructor.

- Learners in M-Learning ecosystem will be able to draw information and interactive content from a huge variety of source.
These sources of m-learning content include applications and databases that have been purpose-built for m-learning by organization at all levels.

M-Learning materials tend to be delivered in small chunks, sometimes referred to as “mobile interactive learning object” (MILOs).

Small bits of information are preferred for mobile learning because of the small screens and because learners are not likely to sit for long stretches working through instructional materials.
Learning Context

- We are currently witnessing a significant shift away from traditional forms of mass communication and editorial push towards user-generated content and individualized communication contexts.

- Users are now actively engaged in shaping their own forms of individualized generation of contexts for learning.

- New relationships between context and production are emerging in that mobile devices not only enable the production of content but also of contexts. They position the user in new relationships with space, the physical world, and place, social space.
Mobile Browsers

- Mobile browsers are optimized so as to display Web content most effectively for small screens on portable devices.

- The fact to contend with for applications of web-based mobile learning content:
  - Web-based applications are usually not as powerful, fast, or detailed as proprietary apps.
  - There are over 30 mobile browsers in use that translate learning content into slightly different formats for display.
The **Opera** web browser is able to reformat regular web pages for optimal fit on small screens and medium-sized (PDA) screens.

Newer mobile browsers are full-featured Web browsers capable of **HTML**, **CSS**, **ECMAScript**, as well as mobile technologies such as **WML**, i-mode HTML, or **cHTML**.
Retrieving Information: Anywhere, Anytime

- Mobile learning involves the flow of information to and from a learner or group of learners.

- Examples of retrieving information using mobile learning technologies:
  - **Customer Education:** It is the provision of mobile learning programs and information for people who buy a company’s products and/or services. Mobile customer education can take the form of short video clips, answers to frequently asked questions, interactive tutorials, and searchable help files.
  - **Digital Media Channels:** It has seen the media on demand (MOD) on the Internet grow rapidly and the devices for accessing media content became personal and pocket-sized.
- **Feeds:** A web feed (or news feed) is a data format used for providing users with frequently updated content. The most common type of feed technology is RSS (Really Simple Syndication or Rich Site Summary). Ex. mLearnopedia

- **Just-in-Time Information:** Its applications deliver the knowledge you need when you need it, such as guides (virtual tours, field trips, and guides visits to museums), job aids (easy and immediate access to the information when on work).

- **Libraries:** Libraries offering mobile collections of audiobooks, e-books, audio language courses, streaming music, films, and images which can be used on mobile devices.
- **Location-Based Information:** Besides identifying the geographical position of the user, it enables the system to distinguish between locations used for different purposes. The application, for example, can tell user the distance to the nearest train station and how long before the next train arrives.

- **Search and Retrieve:** Digital search and retrieval of information is by far the most common learning technology in use. Because of the vast store of available information on the Internet, searching for what we are looking for is a form of informal learning that we have come to take for granted.
**Tags:** There are various ways to attach information to a place or an object, which is then readable by a properly equipped mobile reader.


- Optical tag: reveal their information when a picture is taken of them by an optical tag reader and decoded by appropriate software. Ex. Barcodes, *Quick Response (QR) code*. 

QR code for the URL of the English Wikipedia Mobile main page
Mobile Learning Design Process

- M-learning is important in creating learning experiences – knowledge acquired from activities.
- Central to the creation of engaging and effective learning content and experiences for mobile learning is the role of the designer.
- Designers have to know the characteristics and needs of the end users, the limitations and possibilities of the technologies they’re working with, the best methods for facilitating the learning, and the institution objectives for which mobile learning is being offered as a solution.
Stages of design for mobile learning content and experiences.

1. Evaluate and plan for business needs for mobile learning
2. Understand targeted end-users and their contexts
3. Know the limitations and affordances of the technologies involved
4. Define security requirements
5. Identify access and delivery constraints
6. Develop the mobile learning strategy
7. Design the interaction flow and graphic user interface for ease of navigation
8. Program a functional prototype or use authoring tools
9. Build a learning application
10. Test and evaluate the mobile learning application using target mobile devices
11. Modify and retest if necessary
Most Popular Education Apps

- Top 50 Free Education Apps
- Top 50 Paid Education Apps
Future

Technologies currently being researched for mobile learning include:

- Location aware learning
- Point-and-shoot learning with camera phones and 2D codes
- Near Field Communications (NFC) secure transactions
- Sensors and accelerometers in mobile devices in behavioral based learning
- Mobile content creation (including user generated content)
- Games and simulation for learning on mobile devices
- Context-aware ubiquitous learning
- Augmented reality on mobile devices
Artificial Intelligence in e-Learning Systems
History of AI in e-Learning Systems

- Since the early 1970s scientists have been investigating how computers and artificial intelligence (AI) could be used to improve learning systems.

- The SCHOLAR (computer-assisted instruction) system, developed by Jaime Carbonell in 1970, is often considered to be the first intelligent tutoring system in the United States.

- SCHOLAR spawned a generation of similar systems such as BUGGY in 1978 (which investigated how students solved algebra problems) and SOPHIE in 1982 (which was effectively an artificial domain expert which specialized in electronic system design).
Artificial Intelligence (AI)

- AI might be simplistically described as an attempt to use computers to mimic the functioning of human intelligence.

- AI is made up of intelligent agents that perform functions within an environment.

- An intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success.

- The agent is typically programmed to perceive certain changes in the environment and can learn from those perceptions by testing its actions on the environment.
In this manner complete AI entities are typically made up of multiple intelligent agents that have specific functions within its own domain.
AI in e-Learning

- AI and intelligent agents, in the context of educational systems, can be defined as systems which understand the current state or situation they are in, have the ability to evaluate the options available to them to proceed, and can choose the best course of action to successfully complete their purpose or goals.

- The application of AI within e-learning can produce the potential of creating realistic environments with which students can interact.
The student essentially would interact with the intelligent agents which in turn effect or perceive changes in the simulated environment.

The intelligent agents would then communicate perceived changes in the environment back to the student who then makes decisions based upon their own perceptions of the environment.

Such an environment provides a valuable opportunity to acquire experience before applying in real world situations.
Intelligent Tutoring System (ITS)

- An **ITS** is any computer system that provides direct customized instruction or feedback to students, i.e. without the intervention of human beings, while performing a task.

- ITS implements the theory of **learning by doing** which is a concept within economic theory.

- Learning by doing refer to the capability of workers to improve their productivity by regularly repeating the same type of action. The increased productivity is achieved through practice, self-perfection and minor innovations.
ITS instruct students in an intelligent way and typically consists of an internal model of the expert knowledge, the learner's current knowledge and the pedagogical principles.

As learning progresses, the model of the learner's knowledge and the model of the expert's knowledge are compared, and using AI, the sequence of instructions is dynamically generated to suit the needs of the learner.

Intelligent Tutor Systems have been around since the late 1970s, but increased in popularity in the 1990s.
The ITS consists of four basic components:

- User interface module
- Tutoring module
- Expert knowledge module
- Student model module
Expert knowledge module

- *Expert knowledge module*, like a human expert, has knowledge about the particular subject matter to be conveyed to the student.

- This module uses various techniques (e.g., sets of rules, semantic nets or frameworks) for sorting this knowledge.

- The expert module also includes reasoning capabilities that are used to determine correct solutions to problems.
Student model module

- **Student model module** represents the student's current state of knowledge at any point of time.
- This model is able to respond to learning styles of different students by delivering customized instructions.
- Ideally, this model gathers information about the students' knowledge and behavior including prior relevant learning, progress with the curriculum, preferred learning styles, and other types of learner-related information that could have possible implications on their performance and learning styles.
- The student model is also used as the basis for corrective feedback.
**Tutoring module**

- *Tutoring module* also called the instructional module or pedagogic module, designs and regulates instructional interactions with students.

- It gathers information about student's current performance level correlates this information with its own pedagogic goal and finally decides which pedagogic activities will be presented.

- In other words, this module is responsible for the curriculum sequencing.
User interface module

- Student interacts with ITS through user interface module.
- This module is responsible for presenting the information to the student and provides a high level of meaningful interaction between ITS and the students.
- The acceptance of any ITS highly depends on the ease of use and attractiveness of this module.
Researchers had shown that students who were tutored 1:1 outperformed 98% of their peers. With 1:1 teacher to student ratios an impossibility due to costs, ITS incorporating AI provide a cost-effective alternative for school districts to meet that goal (Andersen, 2011; Rishi & Govil, 2008).

Today’s Intelligent Learning Systems (ILS) can include sophisticated AI agents which may have advanced animated interfaces and, in some cases, may even mimic emotional responses and interactions.
Intelligent Learning Environment (ILE)

- Traditional ITS are able to support and control student's learning but doesn't provide space for student-driven learning and knowledge acquisition. However, an ILE includes special component to support student-driven learning.

- ILEs are based on various combinations of principles from microworlds, intelligent tutoring systems, cognitive tools and CSCL.

- The ILE is a learning space in a virtual environment (such as Second Life or OpenSimulator) that supports collaborative tasks and also provides intelligent interactive actions to help the students and teachers get a better learning outcome.
The term *environment* is used to refer to that part of the system specifying or supporting the activities that the student does and the methods available to the student to do those activities.

ILEs support *discovery learning* through reflective interaction as well as curriculum-driven learning through scaffolding and coaching.

ILEs are concerned with students developing both general and domain specific thinking and problem solving skills.
Current & Trends

- For students in industrialized countries, where a better education no longer correlates to having a higher living standard, Artificial Intelligence (AI) and personalized learning environments can play an important role in providing the required motivation for these students to learn (Andersen, 2011).

- AI based systems with teachable agents and animated user interfaces provide an unprecedented opportunity to improve the learning experience by personalizing it to the learner, and the improvement in student motivation, ownership and engagement warrants further exploration.
Future trends of AI in e-Learning system point to integration with social networks, both technologically and pedagogically, and Web 3.0, termed the ‘semantic web’, could make these systems genuinely able to understand the information they contain leading to greater adaptation to the needs of individual students.
Evaluation of E-Learning
Why Evaluation of e-Learning?

- Although recent attention has increased e-learning evaluation, the current research base for evaluating e-learning is inadequate.

  - Is e-learning effective?
  - In what contexts?
  - For what groups of learners?
  - How do different learners respond?
  - Are there marked differences between different ICT (Information and Communication Technologies) platforms?
  - Does the socio-cultural environment make a difference?
  - Considering the costs of implementing ICT based training, is there a positive return on investment?
The primary aim of the evaluation is to provide feedback to influence e-learning implementation and future development.

The development of models and tools for the evaluation of e-learning can help in improving the quality of e-learning and in informing and shaping future development in policy and practice.
Tools for Evaluation e-Learning

- There is an abundance of tools for the evaluation of e-learning. However, these are mainly divided into two types.
  - Firstly, there are many on-line data gathering instruments for assessing, typically, the user interface characteristics of software (e.g. student perception questionnaires).
  - Secondly, there are devices to record and analyse usage by duration and frequency of log-in, pages accessed, user profile etc.

- Many of these tools are sophisticated in their design and ingenuity but lack guidance on interpretation and analysis.
Variables for Evaluation Framework

- There are five major clusters of variables for evaluation framework of e-learning.

1. Individual learner variables include:
   - physical characteristics (e.g. age, sex, physical abilities)
   - learning history, (negative/positive experience, level of attainment, duration, recency etc.)
   - learner attitude (positive/negative)
   - learner motivation (high/low)
   - familiarity with the technology
2. **Learning environment variables** include
   - the immediate (physical) learning environment
   - the organizational or institutional environment
   - the subject environment

3. **Contextual variables** include
   - socio-economic factors (e.g. class, gender,)
   - the political context (e.g. who is funding/paying for the e-learning and for what reason?)
   - cultural background (e.g. how highly is learning/e-learning valued?)
   - geographic location (e.g. country, language, urban/rural)
4. Pedagogic variables include

- level and nature of learner support systems
- accessibility issues.
- methodologies
- flexibility
- learner autonomy
- selection and recruitment
- assessment and examination
- accreditation and certification
5. Technology variables include

- hardware
- software,
- connectivity,
- the media
- mode of delivery

This framework can be used to develop a robust classification system with clearly identified levels of aggregation (which themselves may be context determined) for mapping and coding existing work into the effectiveness, efficiency and economy of e-learning evaluation study.
The evaluating e-learning is no different than evaluating any other form of learning – but that there are many variables and that the models and tools must take account of the different aims of the evaluations and contexts in which e-learning is taking place.

Evaluation is a relatively young field and still draws heavily on methodologies adapted from anthropology, sociology, psychology, philosophy, economics and mathematics.
Role of Evaluation

- An essential aspect of an e-learning course or curriculum is the evaluation of e-learning, which is part of any instructional design model.

- For example, the highly popular ADDIE model illustrates where evaluation fits into the process of educational (instructional) design.

- ADDIE model consists of five phases—Analysis, Design, Development, Implementation, and Evaluation, which represent a dynamic, flexible guideline for building effective training and performance support tools.
Five of Phases of ADDIE Model

Diagram by: Steven J. McGriff, Instructional Systems, College of Education, Penn State University
Analysis Phase

In the analysis phase, the instructional problem is clarified, the instructional goals and objectives are established and the learning environment and learner's existing knowledge and skills are identified. Some of questions addressed are:

- Who are the learners and what are their characteristics?
- What is the new behavioral outcome?
- What types of learning constraints exist?
- What are the delivery options?
- What are the pedagogical considerations?
- What are the Adult Learning Theory considerations?
- What is the timeline for project completion?
Design Phase

The design phase deals with learning objectives, assessment instruments, exercises, content, subject matter analysis, lesson planning and media selection. The steps involved are:

- Document the project's instructional, visual and technical design strategy
- Apply instructional strategies according to the intended behavioral outcomes by domain (cognitive, affective, and psychomotor).
- Design the user interface and/or user experience
- Create prototype
- Apply visual design (graphic design)
Development Phase

- The development phase is where instructional designers and developers create and assemble the content assets that were blueprinted in the design phase.

- In this phase, storyboards and graphics are designed. Programmers develop and/or integrate technologies for e-learning. Testers perform debugging procedures. The project is reviewed and revised according to the feedback received.
Implementation Phase

- During the implementation phase, a procedure for training the facilitators and the learners is developed. The facilitators' training should cover the course curriculum, learning outcomes, method of delivery, and testing procedures.

- Preparation of the learners includes training them on new tools (software/hardware) and student registration.

- This is also the phase where the project manager ensures that the learning application or website is functional.
Evaluation Phase

- The evaluation phase consists of two parts: formative and summative.

**Formative evaluation** is present in each stage of the ADDIE process.

**Summative evaluation** consists of tests designed for domain specific criterion-related referenced items and providing opportunities for feedback from the users which were identified.
Evaluation occurs:

- Before the e-Learning (needs assessment) to plan e-Learning
- During the e-Learning (formative evaluation) to make improvements, and
- After the e-Learning (summative evaluation) to determine outcomes.

Evaluation is a key aspect of any instructional design model due to the fact that the course cannot be tailored, redesigned, and improved upon unless this is done.
If, after the evaluation, the training is altered to make sure the training is liked by the learners it can lead to an increase in participation in the training, an increase in learner retention, ensuring that it accommodates different learning styles, etc.
Enhance Course Evaluation

It is possible to identify four main practical recommendations to enhance course evaluation.

1. The evaluation of a course should consider the collection of feedback from all stakeholders involved in the design and running of the course. This should include, in addition to students, the collection of data from tutors, administrators, and technical support staff.
2. The evaluation should be designed as an integral part of the activities of the course, and should include collection of feedback during the run of the course as well as at the end of it.

3. The evaluation should consider the additional strategies available to collect feedback according to the delivery mode, taking advantage of the technology in use in the course.

4. The evaluation should include all aspects relevant to the use of technology in the teaching and learning of the course.
Four Levels of Evaluating Learning

- In 1959, Donald Kirkpatrick published a taxonomy of criteria for evaluating instruction that is widely regarded as the standard for evaluating training.

- Kirkpatrick's idea still remains one of the most widely used models of evaluation today.

- Most often referred to as “Levels,” the Kirkpatrick taxonomy classifies types of evaluation as:
  
  Type (Level) 1: **Reaction** -- Learner satisfaction; Did they like it? or Was the material relevant to their work?

  Type (Level) 2: **Learning** -- Learner demonstration of understanding and have advanced in skills, knowledge and attitude.
Type (Level) 3: **Performance** -- Learner demonstration of skills or behaviors on the job and if the skills, knowledge, or attitude has been effectively transferred into everyday life activities as required

Type (Level) 4: **Results** -- Impact of those new behaviors or skills on the job, such as, increased production, improved quality, decreased costs, reduced frequency of accidents, increased sales, and even higher profits.

- Jack Phillips later added a fifth level, **Return on Investment (ROI) of training**, purporting to offer calculations for demonstrating cost effectiveness of the training intervention.
For an evaluation to be effective, it needs to be planned before the course starts, it needs to be part of the overall design of the course, and students need to be informed about the evaluation from the outset. The evaluation of a course should:

1. Collect feedback from all stakeholders: students, tutors, administrators, and technical support staff.
2. Collect feedback from staff by: Formally organising frequent staff meetings (online or face-to-face), and define an agenda for each meeting covering all key issues.
3. Collect student feedback as an integral part of the activities of the course. This should include:
   a) Collection of student feedback during the run of the course
   b) Collection of student feedback at the end of the course

4. Consider the use of additional strategies to collect feedback taking advantage of the technology in use in the course.

5. Consider all relevant aspects of the use of technology in teaching and learning in the course. This might include collecting feedback on:
   a) Quality, usefulness and frequency of use of the different course components (online activities, face-to-face events, readings, online discussions, tutor support, technical support, etc)
b) How well the online activities run (timing, frequency, sequence, instructions, interactions, feedback, time on task, etc.)

c) E-learning experience (workload, involvement, online participation facilitators and obstacles, etc.)

d) Role of tutors (engagement, feedback, support, etc.)

There are different evaluation questions which arise at different points in the life cycle of a course, such as annual review and mid-course review.
The Trend of E-Learning
Trends in e-Learning

- A more responsive e-Learning
- e-Learning by assignment
- e-Learning as a way of life

Reference: Chapter 16, The e-learning handbook, LB1028.5 E38 2008 Lib 4F
Virtual education refers to instruction in a learning environment where teacher and student are separated by time or space, or both, and the teacher provides course content through the use of methods such as course management applications, multimedia resources, the internet, and videoconferencing. Students receive the content and communicate with the teacher via the same technologies.
E-Learning consists of

- Participants: students and teachers.
- Content:
  - LMS (Learning Management System)