

2: What is learning technology? Some definitions.

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Learning Technology is defined as: The application of technology for the enhancement of teaching, learning and assessment. Learning Technology includes computer-based learning and multimedia materials and the use of networks and communications systems to support learning. Learning Technology clearly embraces a wide range of applications, some of which, in the past have been classified under various acronyms such as the following:

CAI	Computer Aided Instruction
CAL	Computer Aided Learning
CBL	Computer Based Learning
CBT	Computer Based Training

Newer technologies which are included within Learning Technology have also brought with them their own acronyms. For example:

CAA	Computer Aided Assessment
CMC	Computer Mediated Communications

An essential component in a Learning Technology package is the ease with which the learner can interact with the contents. This is often referred to as the HCI, or Human-Computer Interface.

The following categories indicate the main application areas for Learning Technology:

- Drill and practice
- Tutorials
- Information retrieval systems
- Simulations
- Microworlds
- Cognitive tools for learning
- Productivity tools
- Communication tools

A further category refers more to learning about computers rather than learning with computers. This is the use of programming languages and software to control equipment.

Features and characteristics of educational software

Drill and practice

Drill and practice packages offer structured reinforcement of previously learned concepts. They are based on question and answer interactions and should give the student appropriate feedback. Drill and practice packages may use games to increase motivation.

Tutorials

Tutorials are used to teach new concepts and processes. Material is presented to the student in a structured format. Tutorial software usually includes worked examples and gives the learner the opportunity to assess their understanding with questions, answers and feedback. Intelligent Tutoring systems are capable of corrective feedback and adapt their presentations to suit the learner, based on the actions of the learner.

Information retrieval systems

Information retrieval systems store knowledge in a structured way and allow the learner to browse or search for information as required. They include on-line databases; structured information systems such as dictionaries and encyclopaedias and also hypertext and hypermedia reference systems.

Simulations

Simulations model an experiment or a real life or imaginary situation. The context of the simulation may be a business plan or a laboratory experiment or an animation of the working of a chemical plant. Simulations usually are based on interactive graphics and give the learner the ability to visualise a process and explore the effect of changing parameters on the operation of the system.

Microworlds

Microworlds use the computer to create a problem solving environment and are derived from the work of the cognitive psychologist Jean Piaget. Seymour Papert, for example, introduced the Logo language into schools to encourage children to learn about mathematics in a Mathland microworld.

Cognitive tools for learning

Cognitive tools for learning are based on the constructivist principle that learners need to construct their own understanding of new concepts. These tools give the learner a way (often graphical) of representing their understanding of new knowledge and concepts and how they relate to existing knowledge and concepts. Expert systems and authoring tools can also be used in this way, allowing the learner to present his/her understanding in a way that can be accessed by other learners.

Productivity Tools

Productivity tools include applications such as word processors, spreadsheets, databases, graphics, desktop publishing and presentation packages. Whilst these tools are not specific to Learning Technology, if used within a pedagogical framework, they can support learning by enhancing the quality of the learning process and by improving student productivity. For example, word processing encourages drafting, reflection and editing and removes from the student the chore of having to re-write any written submission. Spreadsheets can promote a structured approach to problem solving and enable the student to spend more time on the task in hand rather than on routine or lengthy calculations. Databases can be used to help students, as well as staff, to organise information related to their courses and to develop their information handling skills.

Graphics and desktop publishing packages enable staff and students to achieve a higher quality of presentation. Good quality handouts make for greater clarity and improve student motivation. These tools also enable students to produce high quality submissions and encourage the development of transferable written presentation skills which will stand them in good stead in future employment.

Presentation packages provide much the same benefits for spoken presentations as the graphics and desktop publishing packages do for written one. They are clearly of great benefit to support conventional lectures, enabling the lecturer to draw together text and graphics. Equally they are helpful in enabling students to demonstrate their understanding of new knowledge and its applications, supporting them in the development of oral presentation skills.

Communication tools

Computer-mediated communication takes several forms including electronic mail, electronic conferencing, video conferencing and the World Wide Web. These tools allow learners to share ideas and information, to co-operate, to collaborate on joint work and can also be used for submission and publication of students' assignments and of tutors' comments on students' work.

Electronic mail (e-mail) is an asynchronous communications medium, not requiring the recipient of a message to be co-ordinated in time or place with the sender. Further, e-mail can be used one-to-many, as well as one-to-one. These characteristics are helpful in maintaining communications between tutor and student, tutor and students and among students since they overcome constraints of distance and time. E-mail is also a useful tool for course managers particularly where distance or open learning components are involved.

Like e-mail, **electronic conferencing** is asynchronous and can be used at a location of the user's choice, given access to appropriate equipment. It provides a structured forum for the exchange of ideas and, because of its

asynchronous nature, promotes reflective participation. It can be used to replace or augment, for example, face-to-face seminars where a student electronically presents a case and the rest of the group electronically debate the points raised. Here as the contributions are electronically 'saved', they are available for participants and tutors to review during or at the end of the conference, a factor that also provides a possible vehicle for assessment. Electronic conferencing need not be restricted to text, any form of computer files can be handled including, for example, graphics and stored sound.

Unlike electronic conferencing **video conferencing** is synchronous, the participants interact in real time, either one-to-one, one-to-many or many-to-many. Although one of the main benefits of video conferencing is to avoid travel it is often necessary for participants to go to a local centre which has the appropriate facilities, unless they have desktop facilities which support video conferencing. One of the objectives of the Scottish Metropolitan Area Networks initiative is to promote the use of video conferencing within the Higher Education system by the provision of video conferencing suites and network facilities capable of giving priority to video conferencing traffic.

As well as providing a range of on-line communication tools, on-line communications can provide access to the **World Wide Web** (WWW). The WWW consists of millions of information sites between which information providers have set up hypertext/hypermedia links. By visiting one site of particular relevance, you are likely to find at that site a number of links to other sites which will also prove of interest to you. The WWW is capable of supporting multimedia pages as well as plain text. It is by no means a passive resource. It is possible for staff and students to search the web to locate sites of interest, to give feedback to information providers through on-line comment forms and to create web sites for use within the teaching and learning process.