

**Telematic teaching of adults via the World Wide Web:
A university case study**

by

Patricia Ann Clarke

**Submitted in partial fulfillment of the academic requirements for the degree of
Master of Education (Computer-Assisted Education)**

University of Pretoria

1998

Supervisor: Prof. Dr J.C. Cronjé

Abstract

This thesis investigates the feasibility of using the World Wide Web for the telematic teaching of adults i.e. methods of learning delivery/interaction that employ telecommunications media. The focus of the investigation was a Master's level course module presented via a Web-based 'virtual' classroom, to facilitate individual and collaborative projects.

Opinions and experiences of participants were monitored through electronic mail interviews with the course presenter and participating students.

To establish the effectiveness of interactivity and communication by electronic mail in enhancing Web-based learning, this study incorporates both qualitative and quantitative analyses of messages sent to a dedicated electronic mailing list during the course.

Overall the results of this study indicate that, provided students have access to stable and reliable telecommunication links, telematic methodologies can be effective facilitators of course delivery for both individual and collaborative projects. Moreover, email interaction and communication among course participants as well as between course participants and the course presenter, can be an invaluable enhancement to Web-delivered learning material.

Keywords: Telematic education; Web-based learning

Samevatting

Hierdie skripsie ondersoek die moontlikheid van die gebruik van die Wêreldwye Web vir telematiese onderrig van volwassenes, d.i. metodes van onderrigaanbieding en -interaksie met behulp van telekommunikasie.

Die ondersoek is afgespits op 'n Meestersgraadmodule aangebied deur middel van 'n Web-gebaseerde 'virtuele' klaskamer, wat ook individuele- en groepsprojekte ingesluit het.

Die menings en ondervindings van deelnemers en die kursusaanbieder is deur middel van elektroniese onderhoude verkry, en elektroniese vraelyste is ook aan studente gestuur.

Om die doeltreffendheid van interaktiwiteit en kommunikasie deur middel van e-pos in die bevordering van Web gebaseerde onderrig vas te stel, het die studie beide kwantitatiewe en kwalitatiewe analises van al die boodskappe tussen deelnemers ingesluit. Hierdie boodskappe is na 'n geslote elektroniese poslys gestuur wat gedurende die module gebruik is.

Die resultate van die studie toon dat, as studente betroubare telekommunikasie-verbinding het, telematiese onderrig 'n effektiewe wyse van kursusaanbieding is, en ook vir individuele en groepsprojekte geskik is. Verder is interaksie en kommunikasie deur middel van e-pos onderling tussen kursusgangers asook met die kursusaanbieder 'n waardevolle aanvulling tot Web versende studiemateriaal.

Sleutelwoorde: Telematiese onderrig; Web gebaseerde onderrig

Acknowledgements

I wish to place on record my sincere thanks to the following:

- My thesis supervisor and mentor, Professor Johannes Cronjé, Department of Didactics, University of Pretoria, for his guidance and encouragement and for being a model constructivist facilitator who believes that learners really can do it for themselves.
- Cheryl Hodgkinson, formerly of the Department of Didactics, University of Pretoria, for her encouragement and facilitation of useful 'squirreling' in the early stages of the project.
- My *lebensgefährte*, Leon, for many sacrifices, much support and the good home cooking that sustained me during this and all other projects.
- The M. Ed. (Computer-assisted Education) class of '97 for their enthusiastic participation in the 'virtual' classroom on which this thesis is based.
- The Centre for Science Development (HSRC, South Africa) for its financial assistance. The opinions expressed and conclusions arrived at in this study are those of the author and are not necessarily to be attributed to the Centre for Science Development.

Flow chart of thesis contents

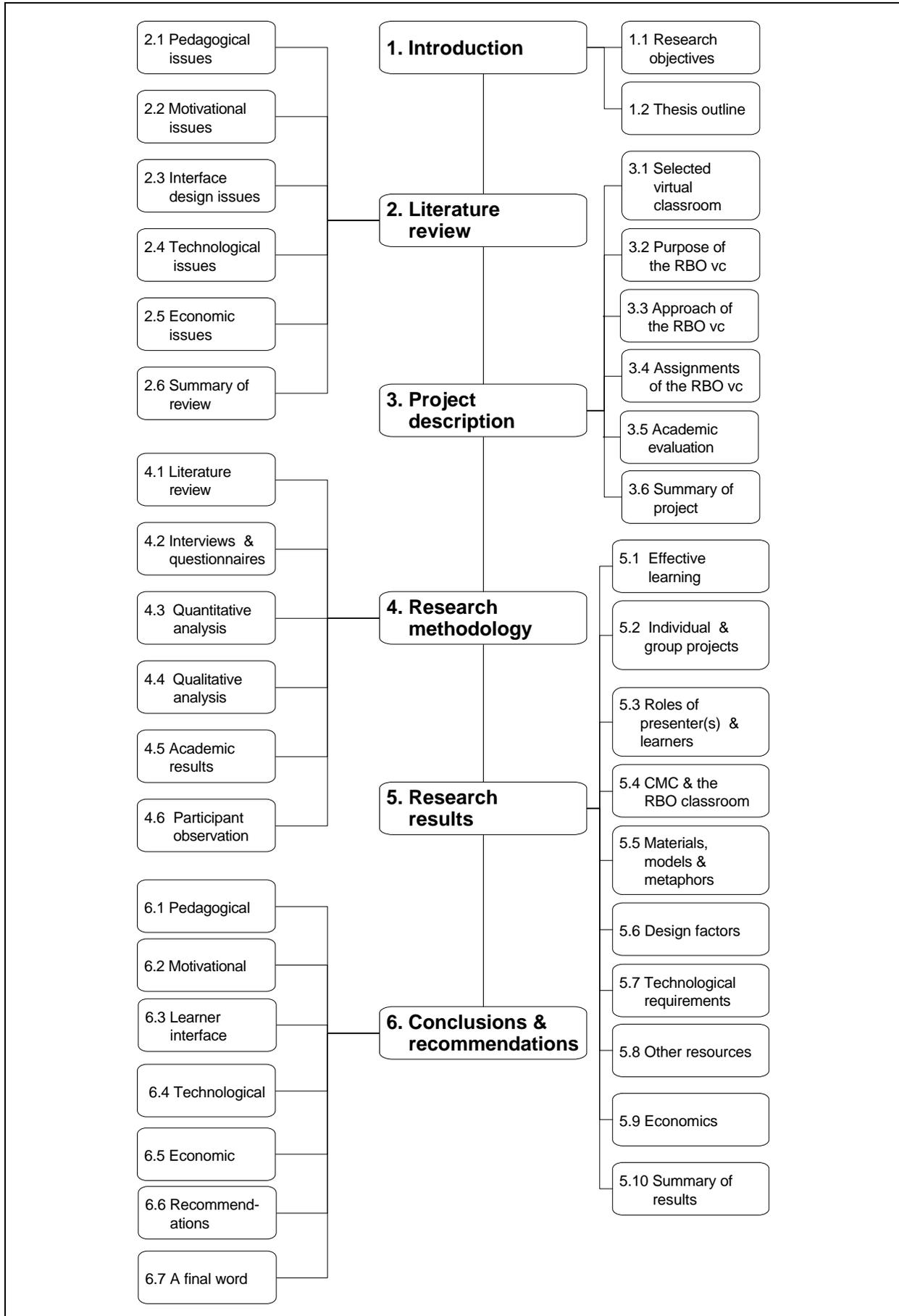


Table of contents

Samevatting	ii
Table of contents	iii
List of tables	vii
List of figures	viii
List of Appendices	ix
Glossary	x
Acknowledgements	xviii
Abstract	xix
Flow chart of thesis contents	xx
Chapter 1 Introduction	1
1.1 Research objectives.....	3
1.2 Thesis outline	5
Chapter 2 Literature Review	6
2.1 Pedagogical issues of Web-based learning.....	8
2.1.1 The web as a facilitator of learning.....	8
2.1.1.1 <i>Definitions of the Web</i>	8
2.1.1.2 <i>Learning benefits of Web-based material</i>	8
2.1.1.3 <i>The Web as facilitator of adult learning</i>	9
2.1.1.4 <i>Web-based material and cognitive learning objectives</i>	9
2.1.1.5 <i>Web-based material and learning styles</i>	12
2.1.1.6 <i>Limitations for learning with Web-based material</i>	13
2.1.1.7 <i>The World Wide Web as facilitator of change in learning</i>	14
2.1.1.8 <i>The 'virtual classroom' and learning</i>	15
2.1.2 Web-based collaborative learning	16
2.1.3 Computer mediated communication (CMC).....	16
2.1.3.1 <i>CMC methodologies</i>	16
2.1.3.2 <i>Advantages of CMC for learning</i>	18
2.1.3.3 <i>Limitations of CMC for learning</i>	19
2.1.3.4 <i>The nature of communicating via CMC</i>	20
2.1.4 Roles of learners and course presenters in Web-based learning.....	21

2.2	Motivational issues and Web-based learning	21
2.3	Interface design issues and learning	22
2.4	Technological issues and Web-based learning.....	24
2.4.1	Technical benefits of Web-based material.....	24
2.4.2	Technical limitations of Web-based material	25
2.4.3	Current technical requirements for Web-based learning.....	28
2.5	Economic issues and Web-based learning.....	29
2.6	Summary of review.....	30
Chapter 3	Project description	31
3.1	The selected 'virtual classroom'.....	32
3.1.1	Background to the on-line course	33
3.1.2	Students of the on-line course	33
3.1.3	Components of the 1997 RBO Virtual Classroom.....	35
3.1.3.1	<i>The RBO classroom Web site</i>	35
3.1.3.2	<i>The RBO classroom email list</i>	40
3.2	Purpose of the RBO Virtual Classroom	41
3.3	Approach of the RBO Virtual Classroom	41
3.4	Assignments of the RBO on-line course.....	42
3.5	Academic evaluation of course.....	44
3.6	Summary of project	45
Chapter 4	Research methodology	46
4.1	Literature review.....	47
4.2	Interviews and questionnaires	47
4.3	Quantitative analysis	49
4.4	Qualitative analysis	50
4.5	Academic results.....	51
4.6	Participant observation.....	51

Chapter 5 Research results	52
5.1 To what extent can a Web and email delivered course adequately facilitate and enhance learning?	54
5.1.1 Academic results	54
5.1.2 Students' perceptions of their course results and learning	55
5.1.3 To what extent can a Web and email delivered course meet the needs of adult learners?.....	57
5.2 To what extent can a Web and email delivered course facilitate individual and collaborative projects?	58
5.2.1 Course project results	58
5.2.2 Students' perceptions of group work in the RBO Virtual Classroom.....	59
5.2.2.1 <i>Group process</i>	59
5.2.3 Course presenter's perceptions of RBO group work.....	62
5.3 How does this delivery method affect the roles of course presenter(s) and learners?	63
5.3.1 Course presenter's roles in the RBO on-line course	65
5.3.2 Students' roles in the RBO on-line course	66
5.3.3 Consequences of flexible roles	67
5.4 To what extent can a Web and email delivered course provide adequate and effective communication among learners and between learners and course presenter?.....	67
5.4.1 Quantitative analysis of communication in the RBO classroom	67
5.4.1.1 <i>Message flow in the RBO virtual classroom</i>	68
5.4.1.2 <i>Frequency of messages in the RBO classroom</i>	69
5.4.1.3 <i>Message totals sent by participants of the RBO classroom</i>	70
5.4.1.4 <i>Days and times of communication in the RBO classroom</i>	71
5.4.1.5 <i>Language of communication in the RBO classroom</i>	72
5.4.2 Qualitative analysis of communication in the RBO classroom.....	73
5.4.2.1 <i>Intermessage reference analysis</i>	73
5.4.2.2 <i>Analysis of message acts</i>	75
5.4.2.3 <i>Analysis of message contents/topics</i>	79
5.4.2.4 <i>Comparison of communication in the RBO on-line course with that of the face-to-face courses</i>	81

5.5 To what extent can a Web delivered course provide materials, models and metaphors to learners that elicit sufficient extrinsic and intrinsic motivation?	83
5.6 What design factors factors best facilitate learning via on-line Web-based material?	84
5.7 What level of computer and telecommunication equipment is required for course delivery, access and communication?	86
5.8 What other resources and costs are required to set up, maintain and deliver such a course?	86
5.8.1 Classroom development and delivery.....	86
5.8.1.1 <i>Software</i>	87
5.8.1.2 <i>Staff time</i>	87
5.8.2 Classroom access	88
5.9 To what extent can this approach generate cost savings for course presenter(s) and learners?	89
5.10 Summary of results	90
Chapter 6 Conclusions and recommendations	92
6.1 Key pedagogical factors in the RBO on-line course.....	94
6.1.1 Constructivist model and participant roles	94
6.2 Key motivational aspects of the RBO on-line course	95
6.2.1 The role of the assignments	95
6.2.2 The role of the classroom metaphor	96
6.3 Key learner interface aspects of the RBO on-line course	97
6.3.1 The role of the classroom web-site.....	97
6.3.2 The role of the classroom email list	97
6.4 Key technological aspects of the RBO on-line course	99
6.4.1 Internet links.....	99
6.4.2 Course prerequisites	100
6.5 Key economic factors in the RBO on-line course.....	100
6.6 Recommendations	101
6.7 A final word on the RBO classroom methodology.....	103
Bibliography	104

List of Tables

Table 1.1 Questions posed on Web-based telematically delivered courses	4
Table 2.1 Adult learning needs and the Web	10
Table 2.2 Hypertext and Bloom's taxonomy of the cognitive domain	11
Table 2.3 Current shifts in higher education and learning	15
Table 2.4 CMC methodologies	17
Table 3.1 Description of the 16 students of the on-line course	34
Table 4.1 Matrix of research questions and methods	48
Table 5.1 Summary of RBO course results	54
Table 5.2 Course results of students with initial Internet literacy vs. those without initial Internet literacy	54
Table 5.3 Individual and group project results	58
Table 5.4 Roles allocated to group members for collaborative projects	60
Table 5.5 Positive factors that contributed to collaborative work	61
Table 5.6 Factors that were counterproductive to group work	61
Table 5.7 Roles taken by course presenter and students in the RBO Classroom.....	64
Table 5.8 Language distribution in the messages of the RBO classroom	72
Table 5.9 Frequency of referencing of messages by other messages	73
Table 5.10 Summary of message text unit totals	76
Table 5.11 Email software used by students	89
Table 6.1 Recommendations for a successful Web-based on-line course.....	101

List of Figures

Figure 1.1	Outline of Chapter 1	2
Figure 2.1	Outline of Chapter 2.....	7
Figure 2.2	Navigational metaphor.....	23
Figure 3.1	Outline of Chapter 3.....	32
Figure 3.2	Extract from first screen of RBO Virtual Classroom – day one	37
Figure 3.3	Screen of links to learners’ desks – final day of course	38
Figure 3.4	Opening screen of classroom and poster wall – final day of course	39
Figure 3.5	Opening screen of a student’s completed virtual desktop.....	43
Figure 3.6	Opening screen of a completed group project	44
Figure 3.7	Opening screen of a submitted examination project	45
Figure 4.1	Outline of Chapter 4.....	47
Figure 5.1	Outline of Chapter 5.....	53
Figure 5.2	Box-plot of distribution of four course results of M. Ed. students	55
Figure 5.3	Summary of total message flow during the course	68
Figure 5.4	Summary of message flow between students and course presenter	68
Figure 5.5	Message flow per week of course.....	69
Figure 5.6	Distribution of messages from participants to list and course presenter	70
Figure 5.7	Distribution of email messages by days of the week.....	71
Figure 5.8	Extreme times of email message transmission during the course	72
Figure 5.9	Message acts of students and course presenter as percentage of their total message text units.....	77
Figure 5.10	Percentage of course administration message acts posted by course presenter and students.....	78
Figure 5.11	Message topics of students and course presenter as a percentage of their respective total message text units	80
Figure 6.1	Outline of Chapter 6.....	93

List of Appendices

- A. The on-line interview outline emailed to the course presenter on aspects of the RBO Virtual Classroom A1
- B. Emailed questionnaire from the U.K. course observer to students halfway through the course B1
- C. Questionnaire emailed to students after completion of group projects C1
- D. 20 Questions on the 1997 RBO Virtual Classroom emailed to students after completion of the course D1
- E. Welcome page from the Web site of the RBO Virtual Classroom E1
- F. Course objectives from the Web site of the RBO Virtual Classroom F1
- G. Individual assignment instructions from the Web site of the RBO Virtual Classroom..... G1
- H. Collaborative project instructions from the Web site of the RBO Virtual Classroom..... H1
- I. Introductory email message to the RBO class email list I1
- J. Extracts from a short email communication thread J1

Glossary

Account

Provides user with electronic address to facilitate access to *Internet* services after payment to service provider who provides the telephone or direct *network* link to the Internet.

Acrobat

Coding system developed by Adobe systems for electronic publishing applications.

Acronym

A mnemonic technique to assist with memorising or abbreviating information. Each letter of the acronym corresponds to a word in the name or descriptive phrase for the word/object/idea, e.g. *FTP*, *FAQ* and *URL*.

Analogue

Information represented by a continuous electrical signal.

Archie

Software tool for locating information on the Internet via databases of file and directory names taken from anonymous *ftp servers*.

Asynchronous communication

Communication not at the same time or delayed communication.

Backup

A copy file that is transferred to an alternative storage device e.g. floppy diskette, tape or CD-Rom.

Bandwidth

Amount of information that can be sent across the network in a given amount of time. Measured in *bits* per second.

Bit

Contraction of 'binary digit'. The smallest unit of data stored in a computer.

BBS

Acronym for 'Bulletin Board System'. Computerised meeting and announcement system that allows people to carry on discussions, upload and *download* files

Bookmark

The name given to a *Web* site 'marked' for future reference in a *browser*.

Byte

Eight *bits*. Represents sufficient computer memory to store a single character.

Browser

Software program used to look at various kinds of *Internet* resources.

CD-ROM

Acronym for 'compact-disc read-only memory'. Computer storage device developed from audio technology.

CGI

Acronym for 'common gateway interface'. A standard method of extending *Web server* functionality by executing programs or scripts on a *Web server* in response to *Web browser* requests.

Click

To press down and immediately release a button on a computer mouse.

CMC

Acronym for 'computer mediated communication'. Communication facilitated by networked computer technologies that enable learners to communicate even if they are in different locations.

Configuration

The way in which a hardware or software system is set up.

CPU

Acronym for 'computer processing unit'. The main component of a computer that executes program instructions and controls the operation of other parts.

Cyberspace

The online universe where communication is controlled by computer technology. According to William Gibson (*The Neuromancer*, 1984) that universe where computer programs take on visible form.

DHTML

Acronym for 'dynamic hypertext markup language'. Interaction, positioning and style enhancements to *HTML* by means of a scripting language.

Digital

The representation of data or physical quantities by means of digits (discrete elements).

Domain

Position or physical address of a named computer on the *Internet*.

DOS

Acronym for 'disc operating system'. Computer operating system designed for use with disc storage.

Download

Copying a file from a *server* computer to your desktop computer via a *network*.

Editors

Software for manipulating text, images, video, audio, or their combinations.

Email

Contraction of 'electronic mail'. A means of exchanging text messages between computer users linked to a *network*.

Emoticons

'Emotion icons' or keyboard generated characters which, when read side-ways, indicate an emotion e.g. the basic 'smiley' :) or non-smiley :-(

FAQ

Acronym for 'frequently asked questions'. A common type of document on the *Internet* that contains a list of questions and answers on a specific theme. *Usenet* newsgroups on the *Internet* publish regular lists of such questions and answers so that group members do not have to answer the same commonly asked questions repeatedly.

Flame

Hostile, sometimes abusive, *email* messages often in response to posting comments with which the flame generator disagrees.

Firewall

A method of protecting the files and programs on the *network* from users on another network while giving protected network access to networks outside of the firewall.

FTP

Acronym for 'file transfer protocol'. *Internet* file transfer service that provides a way to copy files to and from ftp servers elsewhere on a *network*.

Gateway

A computer program that connects *networks* and translates information from one network format to another.

GIF

Acronym for 'graphic interchange format'. A commonly used graphical file format on the *World Wide Web* (WWW) particularly suitable for lower resolution line-art and logo graphics.

Gopher

A program/protocol developed at the University of Minnesota which provides menu-driven presentation of a variety of *Internet* services that facilitate sourcing and retrieving documents on the Internet.

GUI

Acronym for 'graphical user interface'. Type of computer user interface in which programs and files appear as icons (small graphics).

HCI

Acronym for 'human-computer interaction'. Exchange of information between a person and a computer, through the medium of a user interface.

Homepage

Introductory (front) page or menu page of a *Web site* to which other pages and sites are linked. The home page *URL* is usually the *Web* address of the individual or company.

HTML

Acronym for 'hypertext markup language'. The *SGML*-derived markup language in which most *Web* pages are written.

HTTP

Acronym for 'hypertext transfer protocol'. The *Internet protocol* used to manage communication between *Web* clients (*browsers*) and (computer) *servers*.

Hyperlink

A pointer from text, image or map to a page or other type of file on the *Web*.

Hypermedia

Extends the notion of the *hypertext* link to include links among any set of multimedia objects, including sound, video, and virtual reality. Connotes a higher level of user/*network* interactivity than that implicit in hypertext.

Hypertext

Linked text which facilitates non-linear structure and that enables users to navigate linked material in their own chosen sequence. Originally any textual information on a computer containing jumps to other information. On *Web* pages, hypertext is the primary means of navigation between pages and among *web sites*.

IBM

Acronym for 'International Business Systems'. Multinational company that is the largest manufacturer of computers in the world.

Icons

Small picture on the computer screen representing a function or object. A feature of graphical user interface (*GUI*) which makes computers easier to use as the user points to and *clicks* with a mouse on the pictures rather than types commands.

Information superhighway

Colloquial collective name for the *Internet* and related computer *networks*.

Interactive media

Technological media whereby the content and/or sequence of the content is dependent to a certain extent on the actions or responses of the users.

Internet

A global computer *network* of connected server computers or 'international network' which facilitates connectivity via *TCP/IP* for millions of (client) computers world-wide that have access via a *modem* or cable. Also known as the Net.

Internet Explorer

Microsoft's™ computer software package for browsing the *Web*.

Intranet

Computer *network* usually within an organisation and usually faster, more stable and secure than external networks and often running standardised systems.

IP

Acronym for 'Internet protocol'. Software *protocol* that enables computers to communicate by dividing data into packets for transmission over the Internet.

IRC

Acronym for 'Internet relay chat'. Usually real-time, interactive, text-only discussion system delivered via a networked computer chat *server*.

ISDN

Acronym for 'integrated services digital *network*'. Internationally developed system for improved high *bandwidth* telecommunications.

ISP

Acronym for 'Internet service provider'. A company or organisation that offers users access to the *Internet* for a fee.

IT

Acronym for 'instructional technology'.

ITForum

An electronic listserver that discusses theories, research, new paradigms, and practices in the field of Instructional Technology. Leaders in the field are invited to write a short paper that is posted to the list prior to discussion. Sponsored by the Division of Learning and Performance Environments (DLPE) of the Association for Educational Communications and Technology and the Department of Instructional Technology at the University of Georgia, the list is open to anyone interested in instructional technology including post-graduate students in the field.

Java

A general purpose, platform independent programming language created by Sun Microsystems. Java can be used to create Java 'applets' or small applications that can run animations, *multimedia* and other applications on the *Web*. A Java program is downloaded from the Web server and interpreted by a program running on the computer running the Web browser.

JavaScript

A scripting language useful for handling interactive features in *HTML*. Scripts are executed from the *browser* on the client machine.

Jigsaw method

An approach to group-based project work, in which each member of a group has a particular specialism to contribute to the overall work and product of the group.

JPEG

Acronym for 'joint photographic experts group'. A compression standard for the storage and display of high-resolution colour images on the *Web*.

Kbps

Kilobits per second, units of data rate measurement.

KBps

Kilobytes per second, units of data rate measurement. 1 KBps = 8 Kbps.

LAN

Acronym for 'local area network'. *Network* connecting computers over a short distance.

LEOS

Acronym for 'low earth orbiting satellites'. Facilitate global satellite links for telephones and computers.

Listerver

Computer address service that facilitates membership of a discussion group of any number of like-minded individuals who subscribe to participate in the discussion.

Login/logon

Sign on to a computer *network* system.

Lurk

The practice, particularly of 'newbies' (newcomers to the Internet), of reading messages and information posted on interest *newsgroups* and *list-servers* without posting or participating themselves.

Mb

Contraction of 'megabyte'. Unit of memory equal to 1 024 *kilobytes* (or approximately 1 million bytes).

MCQ

Acronym for 'multiple choice questionnaire'. Questionnaire that requires respondents to answer items by choosing one option from a number of choices.

Modem

Acronym for 'modulator/demodulator'. Hardware that converts between the analog forms for voice and data used in the telephone system and the *digital* forms for data used in computers. Enables a computer to be linked to a *network* via a telephone system.

MOOs

Acronym for 'multi-user domains object-oriented'. A type of *MUD* that keeps the database of objects in memory, which means that the process tends to be large. Typical *MUDs* keep unreferenced objects on disk, and therefore take up less memory.

MUDs

Acronym for 'multi-user dungeons/domains'. Usually text-based, using a primitive English-like set of commands to play interactive role-playing games on the *Internet*. Possible to program for communicating and collaborating on projects.

Multimedia

Digital communication media that include different media such as graphics, audio, animations and video.

Navigation

The process of moving from place to place, particularly in a *hyperlinked* environment.

Netiquette

Contraction of 'network etiquette' or the written and unwritten rules of behavior on the *Internet*.

NetscapeTM

One of two main proprietary brands of software for browsing the *Web*.

Net

Alternative name for the *Internet*.

Network

System of connected computers that can share resources.

Newsgroup

The name for discussion groups on *USENET*.

Newbie

Novice traveler in the *Internet* environment.

PC

Acronym for 'personal computer'.

PDF

Acronym for 'portable document format'.

Peripheral device

Any item of equipment attached to and controlled by a computer e.g. printer, *modem*.

Plug-ins

Set of software modules that integrate into *Web browsers* to offer a range of extra interactive and *multimedia* capabilities.

Protocol

Formal, rigidly-defined set of rules and formats. Computers use protocols to communicate with one another.

Proxy server

An *Internet server* that acts as a *firewall*, mediating traffic between a protected *network* and the Internet.

QSR Nud*IstTM

Acronym for 'Qualitative Solutions and Research; Non-numeric Unstructured Data Indexing Systematising and Theorising', a proprietary computer software package for qualitative data analysis.

Script

Computer code which can be directly executed by a program that understands the language in which the script is written. Scripts do not need to be compiled to be run.

Search engine

In *Web* environments, a tool that allows the user to enter key words and receive a listing of Web sites which are identified by those words.

Server

A computer that offers services on a *network*.

SGML

An ISO (International Standards Organisation) markup language for representing documents on computers. *HTML* is based on SGML concepts.

Signature

Few lines of text appended to the end of an *email* message to indicate the name and address of the sender as well as any quotation or keystroke art with which the sender may like to be associated.

SITE

A distinct location for information and services on the *Internet*.

SLIP

Acronym for 'serial line Internet protocol'. *Internet* standard for transmitting data over serial links between computers.

SPSS™

Acronym for 'Statistical Products and Service Solutions'. Software package for data management and statistical analysis. (Formerly known as Statistical Package for the Social Sciences).

Surfer

Also 'Web-surfer'. Computer user who spends time electronically following links to sites on the *Web*.

Synchronous communication

Real-time communication.

Telnet

Command and program used to *login* from one *Internet* site to another.

TCP/IP

Acronym for 'transfer control protocol/Internet protocol', the standard *protocol* for file transfers on the *Internet*.

UNIX

A multi-user, multi-tasking operating system that exists in various forms and is currently the most common operating system for *servers* on the *Internet*.

URL

Acronym for 'uniform resource locator'. Naming method used to identify addresses of *Web sites*. URLs define the *domain* name of the *Web* server where a resource resides, the port address to be used for communication, and the directory path to access a named *Web* file or resource.

Usability

The degree to which a product is "usable", in terms of how easy or difficult it is to learn to use it and to use it in practice.

Usenet

Internet protocol and service that provides access to a large collection of *newsgroups*, where users gather electronically to exchange information and material related to specific topics or interests.

User interface

Procedures and methods through which a user operates a computer program, e.g. menus, *icons*.

Veronica

Acronym for 'Very Easy Rodent Oriented Net-wide Index to Computerized Archives'. A search tool for navigating the global collection of *Gopher* servers.

Virtual classroom

A computer accessible, on-line learning environment intended to fulfill many of the learning facilitation roles of a physical classroom.

Virus

Software that can replicate and transfer itself from one computer to another without the user being aware.

VRLM

Acronym for 'virtual reality markup language'. The three-dimensional version of *HTML*.

WAN

Acronym for 'wide area network'. *Network* that connects computers distributed over a wide geographical area.

Web

See *World Wide Web*.

Web browser

Software on the client computer that fetches and displays *Web* pages and other *WWW* resources from the *Internet*.

Web pages

Files coded in the *HTML* language and accessible as part of a *Web* site.

Web site

Presence or content at a specific address on the *Web*.

Windows

Microsoft's graphic user interface that has become the standard for IBM *PCs* and compatibles that use *MS-DOS* operating system.

Windows NT

Multi-user, multi-tasking operating system based on Microsoft's™ *Windows* but that does not require *MS-DOS*. Seen as a rival to *Unix*.

World Wide Web

Often referred to as the *Web* or *WWW*. A large-scale, interlinked, global system of distributed *hypermedia* resources with a graphical interface that can be accessed and from which information can be selected for retrieval to a local computer.

WWW

See *World Wide Web*

WYSIWYG

Acronym for 'what you see is what you get'. An editing interface in which a file is displayed as it will appear to an end-user.