NCCA

National Council for Curriculum and Assessment
An Chomhairle Náisiúnta Curaclaim agus Measúnachta

ICT Framework
A structured approach to ICT in Curriculum
and Assessment

Revised Framework

November 2007

Contents

Background

The draft ICT Framework has been restructured and edited in response to findings from the school based developmental initiative (SBDI) which accompanies this document. Essentially, the structure of the Framework has been streamlined and simplified to increase its accessibility to teachers.

The four areas are now classified as **objectives**.

There are fifteen specific **learning outcomes** (which replace the original 18) and represent what is important for students to know in relation to ICT. To assist teachers in tailoring the outcomes to their classes, the learning outcomes are described at three levels of achievement or use.

Learning Opportunities have been identified within the outcomes for each level. These are short statements of what learning would involve, or what it might look like with the Framework. These sample learning opportunities were previously presented as outcomes. The revised, shortened, learning opportunities are outlined as a guide for teachers and are flexible rather than exhaustive. They include suggestions on appropriate activities and ICT tools (highlighted in red font).

Work is currently underway to present the ICT Framework in an accessible online format on the NCCA's **ACTION** Website *(Assessment, Curriculum and Teaching Innovation on the Net).* The ACTION website has been designed to exemplify teaching and learning in different settings, and to encourage teachers to use this on-line environment for planning and assessing and for teaching and learning. As ACTION's name suggests, this site will concentrate on 'showing' rather than 'telling' the features of effective teaching and learning in different educational settings. **Sample activities** will be published on ACTION, showing the classroom application of learning outcomes and demonstrations in the ICT Framework across the three levels of the Framework, using multimedia including text, video and photographs. These sample activities have been developed by teachers participating in this initiative. The architecture for the ACTION website has been developed and initial work is available at: http://action.ncca.ie/.

Introduction

The ICT Framework offers schools **a structured approach to using ICT in curriculum and assessment** by identifying the types of learning with ICT (including knowledge, skills and attitudes) appropriate for students during the period of compulsory education. The ICT Framework is **not a curriculum area or a syllabus**. It is not presented as an *add-on* to teaching and learning but as a tool to help teachers to integrate ICT in teaching and learning. The Framework provides **a guide to teachers** for embedding ICT in curriculum and assessment across curriculum subjects. It is **an enabling Framework**.

The Framework is premised on the belief that ICT can add value to teaching and learning when it is used purposefully and with appropriate resources. Use of ICT Framework will vary from school to school depending on a range of school factors including access to ICT equipment and resources, teacher competence and confidence with ICT and a school's level and stage of planning for ICT in curriculum and assessment.

The ICT Framework is organised in four inter-related areas of learning with ICT at three levels of progression (lower primary to the completion of Junior Cycle). It includes

- objectives which describe the four areas within the framework.
- learning outcomes which identify the knowledge, skills and attitudes which it is expected students will be able to demonstrate for the four areas.
- learning opportunities which illustrate the kinds of activities students engage in across the learning outcomes for the three levels.

Essentially, the ICT Framework aims to help schools to develop students' ICT literacy by promoting uses of ICT that enrich teaching and learning across the primary and junior cycle curriculum.
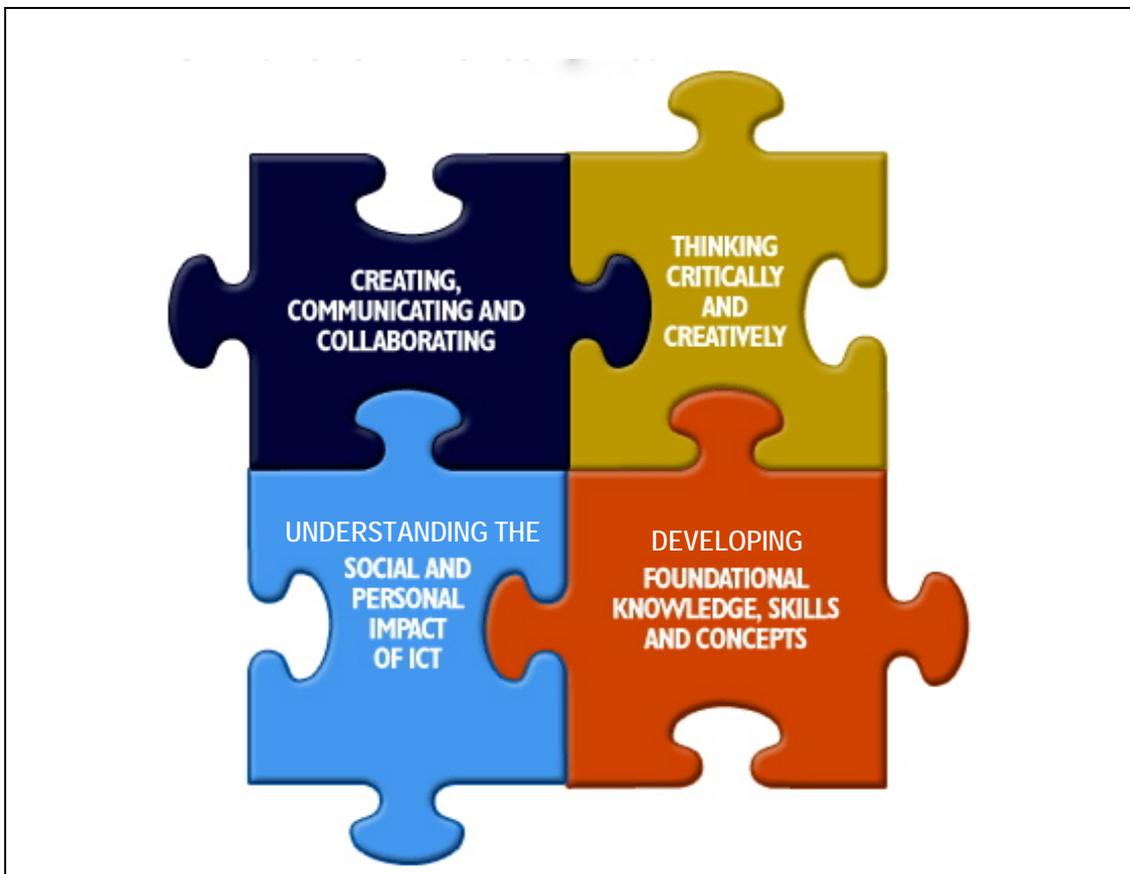
Objectives

The objectives of ICT Framework are to enable teachers to support students in

- exploring the potential of ICT to **create, communicate, and collaborate** to organise and produce information (Area C).
- understanding and applying knowledge of the **functions of ICT** including safe practice, maintenance and ergonomics (Area F).
- using ICT for **thinking and learning** including managing enquiry, assessing information, solving problems, and expressing ideas across a range of curriculum areas (Area T).
- developing a critical appreciation of the **role of ICT in society** and habits which reflect ethical and responsible use of ICT (Area S).

Figure 1 highlights the interconnectedness between these four objectives.

Figure 1. ICT Framework Objectives

Learning Outcomes

The four areas of learning with the ICT Framework described in the Framework's objectives are presented in terms of fifteen learning outcomes in Table 1.

Table 1. ICT Framework Learning Outcomes

Area C	Creating, communicating and collaborating
The student should be enabled to	
C1	draft, format and revise text using ICT
C2	create, manipulate and insert information in a variety of different formats (images, sound, video) using ICT
C3	gather, organise, manipulate and analyse data using ICT
C4	communicate and collaborate locally and globally using ICT
C5	plan, design, create and present information using ICT
Area F	Developing foundational knowledge, skills and concepts
The student should be enabled to	
F1	demonstrate and apply functional knowledge and understanding of ICT
F2	develop skills for maintaining and optimising ICT
F3	understand and practice healthy and safe uses of ICT
Area T	Thinking critically and creatively
The student should be enabled to	
T1	research, access and retrieve information using ICT
T2	evaluate, organise and synthesise information using ICT
T3	express creativity and construct new knowledge and artefacts using ICT
T4	explore and develop problem-solving strategies using ICT
Area S	Understanding the social and personal impact of ICT
The student should be enabled to	
S1	demonstrate understanding and critical awareness of the contribution of ICT to the individual and to our society
S2	develop independent and collaborative learning and language skills using ICT
S3	demonstrate an awareness of, and comply with, responsible and ethical use of ICT

Learning Opportunities

Learning Opportunities have been identified for the outcomes above. These are outlined for three levels of achievement to correspond with junior classes in primary school, senior classes in primary school, and Junior Cycle. Learning opportunities are described at these three levels to support teachers in planning upward continuity and progression in students' use of ICT to support learning and assessment.

The learning opportunities are essentially short statements of what learning would involve, or what it might look like for each outcome and level. These are flexible rather than exhaustive. As the ICT Framework is designed to be an enabling framework for teachers and students, these learning opportunities are described as a guide to teachers. They include reference to specific learning activities and resources which are further elaborated in the glossary. As noted at the outset, use of the ICT Framework, including provision of appropriate Learning Opportunities, will vary from school to school depending on a range of school factors including access to ICT equipment and resources, teacher competence and confidence with ICT and a school's level and stage of planning for ICT in curriculum and assessment.

The learning opportunities are described for each objective on the following pages, beginning with Level 1. For each of the following tables, the relevant outcome is indicated in the left column.

Learning Opportunities for Level 1

Level 1, Area C
Creating, communicating and collaborating

	The student should be enabled to
C1	draft, format and revise text using ICT *Students demonstrate learning at level 1 when they* • *record simple information such as their own name and simple sentences using an age appropriate word processor, writing programme or presentation software.* • *explore text editing techniques such as cut, copy, paste.*
C2	create, manipulate and insert information in a variety of different formats using ICT *Students demonstrate learning at level 1 when they* • *experiment with creative uses of paint and draw tools (e.g. creating simple images using line, shape, pattern and colour).* • *modify existing designs using drawing or painting software.* • *select suitable pictures from image collections, clip art or digital camera to illustrate a story or topic and inserting them in a document or presentation.* • *experiment with recording sound and audio using ICT multimedia tools with teacher or peer support (e.g. MP3 or computer audio files).*
C3	gather, organise, manipulate and analyse data using ICT *Students demonstrate learning at level 1 when they* • *organise images, words or letters in a set, a pattern or sequence with teacher or peer support.* • *save information in a file and save files in a specified personal or class folder.*
C4	communicate and collaborate locally and globally using ICT *Students demonstrate learning at level 1 when they* • *discuss with children in the class and the teacher how ICT is used to communicate with others locally and globally (e.g. text, image, photos, video, newsletters, email, web applications).* • *compose, send, and respond to email with assistance from the teacher.* • *work with the teacher, and children in other classes/schools on collaborative communication, online or exchange projects.* • *collaborate with children in the class and/or other classes within the school to create and share writing, images or projects electronically (e.g. via a class web page, sending an email attachment or other collaborative space).*
C5	plan, design, create and present information using ICT *Students demonstrate learning at level 1 when they* • *create or retell a story in multimedia with teacher support (e.g. images, text and multimedia).* • *present information using audio.*

Level 1, Area F
Developing foundational knowledge, skills and concepts

	The student should be enabled to
F1	demonstrate and apply functional knowledge and understanding of ICT *Students demonstrate learning at level 1 when they* • *perform basic computer and other ICT operations such as turning on computer, printer or digital camera, inserting a disk in computer, running or playing it, ejecting a disk, shutting down, and taking a picture using the digital camera.* • *use some basic ICT terminology correctly (e.g. monitor, mouse, printer and screen).* • *name and recognise the purpose of basic input devices and output devices (e.g. key board, mouse, touch pad, monitor, screen and printer).* • *use a concept keyboard, mouse or joystick to move the cursor on the screen and use some basic key board conventions (e.g. enter, space bar and backspace).* • *open, navigate and close age appropriate software (e.g. interactive books, educational software, creative and multimedia presentation software).* • *recognise and appropriately use some symbols and icons in common software (e.g. open, close, print, save, forward, back, undo, hyperlink and shut down).* • *find letters and numbers for their writing on the key board, and use special keys (e.g. space bar, shift key, delete, backspace, return and arrow keys).* • *use commands, menus and icons to save and print their work (e.g. CTRL_S, save icon, and print icon).* • *use a printer with teacher assistance.* • *play, listen to and view common audio and video media with teacher support.*
F2	develop skills for maintaining and optimising ICT *Students demonstrate learning at level 1 when they* • *take basic care of the computer, keyboard and monitor and understand how to care properly for software.* • *develop responsibility for managing own files and folders (e.g. know how to name a file or folder and find own named files or folders).*
F3	understand and practice healthy and safe uses of ICT *Students demonstrate learning at level 1 when they* • *adopt optimum sitting, hand, arm and fingering positions when using the computer.* • *develop safe habits when using the digital camera and other handheld equipment (e.g. putting strap around neck, using correct grip, etc.).* • *understand class and school procedures and appropriate and inappropriate behaviour when using ICT (e.g. safety when searching and following school rules and guidelines for using ICT resources).*

Level 1, Area T
Thinking critically and creatively

	The student should be enabled to
T1	research, access and retrieve information using ICT *Students demonstrate learning at level 1 when they* • *discuss with the teacher and children in the class the suitability of different resources for an information search (e.g. an encyclopaedia, a book, a CD, a web site or an image bank).* • *realise that information may be found in formats other than text (e.g. image, photo, video, sound, and newsletter).* • *recognise the web browser interface, know what hyperlinks look like and know that they can be clicked to get more information.* • *discuss suitable key words for a topic information search on the Internet or on CD Rom with children in the class and the teacher.* • *conduct simple searches with teacher support (e.g. a simple word search, image search or learning quest).* • *look for relevant information for a topic independently on teacher pre-selected electronic resources (e.g. CD Rom, image bank, web page).*
T2	evaluate, organise, and synthesise information using ICT *Students demonstrate learning at level 1 when they* • *organise information, images or text according to given criteria such as same, different, size, shape etc.* • *discuss with the teacher and peers the usefulness of the results of information searches.* • *begin to distinguish fact from story on teacher selected websites.* • *make sense of information from screen based texts and images.*
T3	express creativity and construct new knowledge and artefacts using ICT *Students demonstrate learning at level 1 when they* • *create new designs and explore and modify images, shapes, drawings, colours and text.* • *express themselves creatively using language, text, image or sounds (e.g. recording sounds or music, recording images for use in projects or stories, or creating shapes).*
T4	explore and develop problem-solving strategies using ICT *Students demonstrate learning at level 1 when they* • *develop subject specific learning skills such as matching, comparing, finding difference, counting, sorting size, shape or colour, measuring, logic, prediction, and putting into order by exploring age appropriate software.* • *describe or recount the stages or steps they went through in completing an activity with ICT.* • *use problem solving strategies to solve simple ICT quests and problems with teacher and or peer support (e.g. in a webquest or with simulation software).*

Level 1, Area S
Understanding the social and personal impact of ICT

	The student should be enabled to
S1	demonstrate understanding and critical awareness of the contribution of ICT to the individual and to our society *Students demonstrate learning at level 1 when they* • *recognise and name some everyday devices which use ICT (e.g. mobile phones, digital cameras, video cameras, DVD players, and GPS in cars, etc.)* • *identify and discuss some of the ways that ICT is used in the home, in the school, and in the everyday life in the community (e.g. communicating, searching, learning, form filling, online banking, booking tickets, photo editing, libraries and shopping, etc.)*
S2	develop independent and collaborative learning and language skills using ICT *Students demonstrate learning at level 1 when they* • *develop an understanding of, and confidence in, themselves as learners (e.g. through recording and retelling ideas and personal stories using ICT resources).* • *develop collaborative learning skills using ICT working in pairs or in groups.*
S3	demonstrate an awareness of, and comply with, responsible and ethical use of ICT *Students demonstrate learning at level 1 when they* • *respect the rights and feelings of others in their use of ICT.* • *recognise the need to follow guidelines for responsible ICT use and care in the school.* • *recognise situations where they should ask for help when there are problems with ICT.* • *develop a concept of ownership of personal work (e.g. understanding why they should not copy or change work created by others).* • *realise that Internet sites and CD programmes have a creator or author.* • *begin to recognise the need for security when using ICT (e.g. recognising what a password is and how it is used).* • *realise that there can be harmful personal consequences to the irresponsible use of ICT.*

Learning Opportunities for Level 2

Level 2, Area C
Creating, communicating and collaborating

	The student should be enabled to
C1	draft, format and revise text using ICT *Students demonstrate learning at level 2 when they* • *recognise and use basic word processing terminology appropriately, (e.g. cursor, open, save, file, window, document, cut, copy, and paste).* • *draft, write and edit original texts (e.g. stories, projects, logs and journals using word processing software and or other suitable applications).* • *explore and use some editing features in a word processor (e.g. spell check).* • *reorganise and format text and information to enhance readability and improve their writing (e.g. rearranging paragraphs, headings, fonts, formats, spacing, text layout).* • *enhance and revise written work using editing features such as paragraph formats, page layout, etc.*
C2	create, manipulate, import and insert information in a variety of different formats (images, sound, video) using ICT *Students demonstrate learning at level 2 when they* • *explore and create drawings, designs, and image files (e.g. using computer paint and draw and or images taken with a digital camera).* • *modify and edit images for use in project work or stories or in creating signs, posters, banners and charts.* • *create or edit a sound recording and using it to enhance or present their work.* • *create information materials, projects and resources using combinations of text, graphics, multimedia and/or sound as appropriate to purpose and audience.*
C3	gather, organise, manipulate and analyse data using ICT *Students demonstrate learning at level 2 when they* • *discuss how information is categorised in a database and look at some examples of how a database is used (e.g. catalogues, library records, photo and gallery collections, etc.).* • *are familiar with some basic database terms (e.g. file, record, index and field).* • *discuss how information is organised in a spreadsheet, and access information in columns, rows and cells.* • *enter previously collected data into a prepared database and/or spreadsheet template.* • *perform a search, access and retrieve information from prepared databases (e.g. library catalogues, dictionaries, maps and encyclopaedia online and on CD Rom).* • *enter and edit data, and produce and interpret a simple graph or chart using a prepared spreadsheet template.* • *collect and record data (e.g. using data-logging equipment to check temperature, light and sound).*

C4	communicate and collaborate locally and globally using ICT
	Students demonstrate learning at level 2 when they
	• *discuss electronic communication methods (e.g. how the Internet and email work, etc.).*
	• *create, send, retrieve, save, and organise email messages with teacher and /or peer support.*
	• *communicate with, share and receive information from others inside and outside the school (e.g. creating, presenting or sharing projects or stories using software applications, group or class folders, email, blogs, pod casts, web cam, and video conference).*
	• *discuss with peers and the teacher selection criteria for presenting material to different audiences such as other classes, other schools, parents and wider audiences (e.g. text, multimedia, website and email).*
	• *participate in and contribute to collaborative online projects.*
C5	plan, design, create and present information using ICT
	Students demonstrate learning at level 2 when they
	• *plan, design and create a multimedia presentation as appropriate for a particular purpose and audience.*
	• *record and communicate ideas, information or stories using various electronic resources, separately or together as appropriate (e.g. using audio devices, digital images, video clips, multimedia presentations, and podcasts).*
	• *present information to audiences inside and outside the classroom using electronic and communication resources (e.g. using text, digital image, multimedia authoring, school website, presentation software, audio, video, and music software).*

Level 2, Area F
Developing foundational knowledge, skills and concepts

	The student should be enabled to
F1	demonstrate and apply functional knowledge and understanding of ICT *Students demonstrate learning at level 2 when they* • *recognise and use basic computer and multimedia terminology (e.g. monitor, key board, mouse, printer, PDA, mobile phone, digital camera, digital video, screen and data projector).* • *identify and correctly use common symbols and icons used in software applications (e.g. font, size, bold, underline, alignment and draw symbols).* • *connect to, access and shut down various ICT devices and peripherals correctly (e.g. computer, digital camera, printer, scanner and data projector).* • *find, open, run and close applications or documents from the desktop, hard drive or removable disk.* • *use input and output devices (e.g. keyboard, mouse, touch pad, track pad, switches, screen, touch screen, screen reader, printer and scanner).* • *create, save, back up, and retrieve, documents, files and other electronic resources (e.g. on the computer hard drive, disk storage devices, CD rom, server and digital camera).* • *move and delete documents, files and other electronic resources.* • *use a web browser to navigate around World Wide Web sites and relevant pages and sections from specified or bookmarked sites.* • *play, listen to and view digital media using audio and video devices and applications (e.g. digital still and video cameras, audio devices and media players).*
F2	develop skills for maintaining and optimising ICT *Students demonstrate learning at level 2 when they* • *save and manage files, images and folders using an agreed naming system.* • *develop systems and processes for backing up files (e.g. recording to a CD, saving to USB device or a school network and uploading images from the camera to the computer).* • *manage personal or class folder space on a drive or network for optimum computer performance (e.g. deleting unwanted files, images, emails, etc. from ICT resources such as the computer, the email folder or digital camera).*
F3	understand and practice healthy and safe uses of ICT *Students demonstrate learning at level 2 when they* • *discuss and adopt safe practices and good ergonomic habits when using ICT (e.g. chair height, good sitting position, screen distance, limit time looking at the screen, and keep camera strap around neck, etc.).* • *discuss and apply school ICT procedures such as the Acceptable Use Policy (AUP).*

Level 2, Area T
Thinking critically and creatively

	The student should be enabled to
T1	research, access and retrieve information using ICT *Students demonstrate learning at level 2 when they* • *discuss and clarify questions with children in the class or with the teacher and identify appropriate electronic resources to search.* • *use techniques such as search, forward, zoom, favourites and links to locate relevant information on electronic resources (e.g. content specific CDs, websites, encyclopaedia, online dictionaries, online map tools, online library catalogues, wikis, and podcasts).* • *access and retrieve information which may be in text, image, audio or video format from electronic sources with teacher or peer guidance.* • *discuss with children in the class and the teacher criteria for suitable key words for information searches.* • *use appropriate key words, phrases and operators such as and/not to find relevant information using a search engine with teacher and or peer support.*
T2	evaluate, organise, and synthesise information using ICT *Students demonstrate learning at level 2 when they* • *discuss and develop techniques for evaluating the credibility, validity and suitability of electronic sources and web sites.* • *organise and categorise information using charts, graphs, concept maps and folders.*
T3	express creativity and construct new knowledge and artefacts using ICT *Students demonstrate learning at level 2 when they* • *explore, clarify and express ideas, feelings and experiences using ICT (e.g. using logs, diaries, text, image, creative multimedia, music software, pod casts, concept mapping, control technology, blogs and wikis).* • *record, present and evaluate their ICT work and resources.* • *plan, make and evaluate artefacts and projects using ICT.*
T4	explore and develop problem-solving strategies using ICT *Students demonstrate learning at level 2 when they* • *support and enhance problem solving skills across the curriculum, (e.g. using content free software to arrange thoughts and set out questions, using spreadsheet data, control technology and simulations, etc.).* • *enquire into, research and explore the nature of a problem using appropriate ICT resources.* • *look for and investigate connections, patterns and relationships between concepts and ideas using ICT resources (e.g. using painting, drawing, graphing or concept mapping software, simulations, spreadsheets and online activities).* • *generate, develop and test ideas and conclusions both individually and using collaborative software (e.g. using spreadsheets, communication software and simulation, etc.).* • *develop simple criteria to evaluate their independent or group ICT solutions.*

Level 2, Area S
Understanding the social and personal impact of ICT

	The student should be enabled to
S1	demonstrate understanding of and critical awareness of the contribution of ICT to the individual and to our society *Students demonstrate learning at level 2 when they* • *recognise the range of ICT now used in homes, schools, hospitals and in workplaces.* • *discuss the uses, advantages, disadvantages and impact of ICT in the home, school, workplaces, and in the wider society.* • *become familiar with some of the beneficial uses of information and communication networks and develop an understanding of the potential for harmful use.*
S2	develop independent and collaborative learning and language skills using ICT *Students demonstrate learning at level 2 when they* • *develop language and interpersonal communication skills and an understanding of the views and perspectives of others using ICT.* • *work collaboratively in planning, creating and presenting material for a variety of audiences.* • *develop team and group work skills, such as taking the initiative, making decisions and accepting responsibility for individual and group contributions to an ICT project.*
S3	demonstrate an awareness of, and comply with, responsible and ethical use of ICT *Students demonstrate learning at level 2 when they* • *recognise and respect the rights and feelings of others when expressing themselves using ICT.* • *recognise the need for, contribute to and adhere to classroom and school rules in using ICT.* • *apply care in using ICT devices, multimedia and digital equipment appropriately.* • *acknowledge the use of others' ideas, work and sources in creating personal, class and group projects (e.g. identifying and recording the name of the author of information or images copied from CD ROMs or the Internet).* • *recognise the reason for copyright laws and apply them appropriately (e.g. in relation to text, images, audio from Internet sites, CD ROMS, other sources).* • *act responsibly in the use of email and communication and collaborative software (e.g. not opening attachments from unknown senders, not replying to unsolicited email, not giving out personal details and applying security and safety measures).* • *use class agreed methods to keep secure their own and other people's information in electronic format (e.g. understanding the use of a password and not revealing their password to others).* • *discuss and implement the school's AUP regarding the Internet, email and other ICT devices.*

Learning Opportunities for Level 3

Level 3, Area C
Creating, communicating and collaborating

	The student should be enabled to
C1	draft, format and revise text using ICT *Students demonstrate learning at level 3 when they* • *create and edit a document using text editing techniques such as cut, copy, paste, text formatting techniques such as bullets and numbering, and working with tables.* • *self correct and enhance their own work using text editing tools such as spellcheck, grammar check and a thesaurus.* • *work with others to edit documents using text editing tools such as comments and track changes.*
C2	create, manipulate and insert information in a variety of different formats (images, sound, video) using ICT *Students demonstrate learning at level 3 when they* • *create and manipulate images using image editing software (e.g. painting, photo editing, computer aided design (CAD) and graphic design software) .* • *import and edit images from a variety of sources (e.g. software packages, the Internet, digital cameras and scanners, etc.).* • *create, record, download and edit sound using input devices and software.* • *create, record and edit video using input devices and software.* • *apply an understanding of different image, sound and video file formats.* • *save image, sound and video files to reuse them in a variety of software applications for publishing in various ways (e.g. presentations, websites, podcasts and DVD, etc).*
C3	gather, organise, manipulate and analyse data *Students demonstrate learning at level 3 when they* • *gather, analyse and present data for a given task by selecting the most appropriate ICT (e.g. database, spreadsheet, online surveys, data loggers, sensors, graphing calculators and GIS systems, etc.).* • *create, enter data in and query a simple database for specific purposes using keyword searches and filters and present results in a meaningful way.* • *create, fill in and analyse a simple spreadsheets for a specific purpose using simple calculations and graphs and present results in a meaningful way (e.g. Pie charts, bar charts and tables, etc.) .* • *create, disseminate, analyse and present the results of an online survey for a specific purpose and audience.* • *use data logging equipment to monitor changing situations in a variety of different settings (e.g. physical, chemical, biological, geographical).*

C4	communicate and collaborate locally and globally *Students demonstrate learning at level 3 when they* • *use a variety of ICT communication and collaboration tools (e.g. mobile phones, PDAs, webcams, GPS, email, VLEs, chatrooms, discussion forums, IM, blogs and social networking websites, etc.).* • *carry out common email activities such as sending, receiving, replying to, forwarding emails; maintaining an address book; sending and accessing email attachments etc..* • *participate in and contribute to collaborative online projects using ICT (e.g. email, video conferencing, blogs, IM, Wikipedia and podcasts, etc..*
C5	plan, design, create and present information *Students demonstrate learning at level 3 when they* • *plan projects for a specific purpose and audience using ICT (e.g. concept maps, flow charts and Gantt charts, etc.).* • *combine digital video, images, sounds and text using appropriate software to create and present a project for a specific purpose and audience in multimedia format (presentation, website, video, DVD and podcasts etc.).*

Level 3, Area F
Developing foundational knowledge, skills and concepts

	The student should be enabled to
F1	demonstrate and apply functional knowledge and understanding of ICT *Students demonstrate learning at level 3 when they* • *discuss ICT commonly used in the home, school and workplace.* • *operate stand alone computers and computers on a local area network.* • *recognise and use symbols and icons in common software applications.* • *operate common hardware devices (e.g. printer, scanner, digital camera, CD/DVD burner, PDA, mobile phone, sound input devices and mp3 players, etc.).* • *use common software applications (e.g. wordprocessors, web browsers, email packages, presentation software, image editing, digital media players, spreadsheets and educational software, etc.).* • *navigate and access information on the Internet using a variety of methods (e.g. bookmarks, inputting URLs, search engines, RSS feeds, directories and Wikipedia, etc.).*
F2	develop skills for maintaining and optimising ICT *Students demonstrate learning at level 3 when they* • *develop good practice in file management (e.g. saving, organising and regularly backing up files and deleting unnecessary outdated files).* • *develop critical awareness of the nature of viruses, worms and spam and know how to address these issues.* • *download and install software updates (e.g. anti-virus software, operating system patches and updates, application software updates).* • *maintain and clean hardware devices (e.g. mice, screens and printers, etc.).*
F3	understand and practice healthy and safe uses of ICT *Students demonstrate learning at level 3 when they* • *engage in ergonomically safe practices in the use of ICT (e.g. sitting position at computer, length of time looking at the screen, chair at correct height and screen at correct distance, etc.).* • *adopt safe practices when using ICT.*

Level 3, Area T
Thinking critically and creatively

	The student should be enabled to
T1	effectively research, access and retrieve information *Students demonstrate learning at level 3 when they* • *define a given task and identify the most appropriate sources and access methods to acquire the required information.* • *organise information retrieved from the Internet and other electronic sources for personal use and for sharing with others.* • *differentiate between primary and secondary sources of information.*
T2	evaluate, organise, and synthesise information *Students demonstrate learning at level 3 when they* • *evaluate the relevance and the reliability of information and data retrieved from electronic sources taking cognizance of possible bias, motive and point of view.* • *extract relevant information from multiple information sets by using ICT to organise information (e.g. concept mapping and word processors, etc.).* • *create new information by synthesising and integrating accessed information using ICT.*
T3	express creativity and construct new knowledge and artefacts *Students demonstrate learning at level 3 when they* • *discuss and discover how ICT can be used to creatively and critically develop and express ideas.* • *develop personal creativity, reflective and critical thinking skills through the use of a variety of ICT.* • *express ideas, thoughts and emotions creatively according to purpose and audience using ICT (e.g. blogs, word processing, painting, concept mapping, music, video editing, control technology and animation software, etc.).*
T4	explore and develop problem-solving strategies using ICT *Students demonstrate learning at level 3 when they* • *develop a planned problem solving strategy prior to commencing a given task using ICT (e.g. concept maps, flow charts, presentation software).* • *select appropriate ICT that may be used to assist in solving specific problems (e.g. spreadsheets, simulation and open-ended software).* • *analyse problems and determine patterns and linkages using a range of ICT (e.g. spreadsheets, databases, modelling and simulation software).* • *test solutions and make predictions and decisions based on evidence presented using ICT (e.g. data logging, modelling and simulation software).*

Level 3, Area S
Understanding the social and personal impact of ICT

	The student should be enabled to
S1	demonstrate understanding and critical awareness of the contribution of ICT to the individual and to our society *Students demonstrate learning at level 3 when they* • *discuss past, current and emerging technologies.* • *assess the impact that ICT has on the individual, education, the workplace and society.* • *analyse and discuss the advantages and disadvantages of widespread use and reliance on technology in education, the workplace and in society.* • *investigate and report on the role of ICT in a career of their choice.* • *investigate the challenges and solutions ICT present in our community/country (e.g. digital divide and social and economic progress, etc.).*
S2	develop independent and collaborative learning and language skills using ICT *Students demonstrate learning at level 3 when they* • *support learning in first and additional languages independently and collaboratively using ICT (e.g. content rich language software, email, Internet, IM, mobile phone, podcasts etc).* • *communicate and collaborate locally, nationally, and internationally with peers, experts and others using appropriate netiquette (e.g. email, IM, web cams, blogs, online collaborative writing tools, message boards, discussion groups, electronic communities, social networking websites etc).* • *develop team building, leadership and personal effectiveness skills through participating in collaborative projects using ICT (e.g. email; Internet; webcam; video production, music composition software, and word processing etc.).*
S3	demonstrate an awareness of and comply with responsible and ethical use of ICT *Students demonstrate learning at level 3 when they* • *discuss, develop, implement and evaluate an acceptable use policy (AUP) (e.g. policies and procedures relating to: using the Internet and email; using mobile phones; installing and updating antiviral, firewall and monitoring software; borrowing and using equipment etc.).* • *discuss and agree the consequence of inappropriate and irresponsible use of ICT (e.g. accessing or posting inappropriate or harmful material, inappropriate interference with the work of other students and being responsible for a virus getting in to the computer system, etc.).* • *respect the rights and feelings of others when working in an electronic environment.* • *discuss and demonstrate appropriate care when using social networking websites.* • *demonstrate an awareness of and comply with national and international copyright laws and "fair use" guidelines and "Creative Commons" in relation to using copyrighted materials for educational purposes.* • *acknowledge the use of others' ideas and work in creating personal and class projects by maintaining a bibliography of resources used and acquire*

	permission of use where required.

Glossary of terms

This glossary explains ICT terms used in the ICT Framework. Terms are hyperlinked from the ICT Framework to the glossary. Additional terms used to explain ICT terms in the Framework are also included in the glossary. Glossary terms are cross referenced by hyperlinks to each other.

Term	Description
address book	A small database, which is part of an email software package, in which the user can store email addresses and other contact details for the individuals and groups he/she corresponds with.
aggregator **(feed reader)**	A software application or web service that collects web feeds such as news headlines, blogs and podcasts from various sources and displays it in a single location for easy viewing.
alignment	The horizontal positioning of text or graphics on a page. Text or graphics can be positioned to the left, right, or centre of a page. Text may also be simultaneously aligned to the left and to the right of a page. This feature is available in word processors and in creative or authoring software.
animation software	Multimedia software that creates the appearance of motion by displaying a series of still images in rapid sequence.
antivirus software	Software designed to detect the presence or occurrence of a computer virus. The software subsequently signals an alert via a variety of mechanisms and, in most commercial products, can then be used to delete the virus.
assistive technology	Software, hardware or other devices that have been specifically designed or adapted to assist people with disabilities in carrying out daily activities. Assistive technologies include text-to-speech screen readers, alternative keyboards and mice, head pointing devices and screen magnification software.
attachment **(email attachment)**	A file which is attached to and sent with, or received with, an email message.
AUP **(acceptable use policy)**	An AUP is a written agreement in the form of guidelines, generally signed by students, their parents and their teachers, outlining the terms and conditions of acceptable use of computers, peripherals and the Internet.
blogs (weblogs)	A blog (web log) is a journal or diary that is available on the web. Blogs often offer commentary on a particular subject. Blogs are typically updated regularly using software that people with little or no technical experience may easily use. The blog creator (blogger) may invite feedback, but retains authoring control of the blog. Blogs are primarily text based although many use photographs, videos or audio.
bookmarks (favourites	A user-created list of website addresses or URLs that facilitate

or hotlist)	easy and direct access.
broadband	High speed Internet access.
	Wireless broadband refers to the availability of a connection to the Internet without cable or power lines.
browser	A software application used to locate and display webpages.
(web browser)	
CAD software	Software for creating engineering and architectural drawings with a high level of detail. CAD software allows the user to manipulate drawings and view them from all angles.
(computer aided design software)	
cell	An intersection of a row and column in a spreadsheet; the place in which text, a number or a formula is entered in a spreadsheet.
chat	A communications medium that permits multiple users to 'chat' with each other in real time rather than stored for later reading. Chat may be used for social networking or in e-learning for student questions, tutor feedback or group discussion.
(chatroom)	
channel	See feed.
collaborative project	A group or groups frequently in different locations working on a joint project towards a common goal.
concept keyboard	An overlay for or alternative to the traditional computer keyboard. Concept keyboards are useful for small children or learners with special needs, for example, offering pictures or symbols as an alternative to the alphabetic keyboard.
concept mapping software	Software for creating diagrams, graphic organisers, webs and concept maps to visually represent concepts and relationships between concepts.
content free software	A term now more frequently referred to as *productivity and communication software* or applications. Such applications provide the user with tools to create and edit content in the form of text, presentations, publications, images, music and web pages, etc. Productivity and communication applications which are web enabled rather than run from software residing on a computer are frequently categorised as Web 2.0 applications.
control technology	Robotics programming, usually comprising programming tools and construction kits. The user can build models and constructions and add functionality or movement to these models using the programmable brick. The brick has a sensor which can be programmed to respond to changes in light, sound, motion etc.
creative commons	Creative Commons', a non-profit organisation has devised a system and associated tools that allow authors, scientists, artists, and educators easily mark their creative work with the copyright freedoms they want it to carry. For example, the creator can use creative commons to change the copyright terms from "All Rights Reserved" to "Some Rights Reserved."
	Creative commons fill in the gap between full copyright, in which no use is permitted without permission, and public

domain, where permission is not required at all.

cursor	A flashing pointer which shows the position where text or other material can be input in the application the user is working on. The cursor can be moved with the arrow keys or the mouse.
data projector	An output device that projects an image that displays on a computer screen onto a large screen, so that the audience such as a classroom of students can see the image clearly.
database software	Software that is used to create databases. A database is an electronic file where information is organised so that it can be easily accessed, managed, and updated. A database is made up of records, and records are made up of fields.
datalogger	A self-contained data-collection device that includes a sensor, battery and interface. Most of these devices can also be connected to a computer and the data transferred.
datalogging	A process of using a computer or graphing calculator and sensors to collect and analyse data and present results.
	Data logging is commonly used in scientific experiments and in monitoring systems. Examples of the types of information a data logging system can collect include temperatures, light intensities, heart beat, electrical currents, pressure and changes in states of matter.
digital divide	Digital divide refers to the gap between those with regular, constructive access to digital and information communications technology, and those without this access. It refers to both physical access to the technology and skills associated with its use.
digital video editing software	Software for editing video files that are in digital formats. Digital editing generally refers to non-linear editing.
digital format	A recording format in which information is stored as a series of numbers, allowing exact duplication of the original information.
digital camera (digital stills camera)	A camera that stores still images digitally onto a memory card or DVD rather than recording them on a film. Once a picture has been taken it can be printed directly using a photo printer or downloaded to a computer for editing. Most modern digital stills camera may also record very short video clips.
digital video camera	A camera for recording digital video (dv) onto a storage medium such as a mini dv tape or DVD. The captured digital video may be transferred to a computer for editing using digital video editing software. Digital video cameras may also capture still images onto the mini dv tape, DVD or an additional memory card found in many digital video cameras.
directories	A directory is the organising system for files. A web directory is a directory on the web that categorises and links to other websites. It is not a search engine in that it does not use key words to categorise.
discussion forums/boards/groups	Online services that allow registered users with common interests to post messages, questions and responses on the Internet for others to read and respond to.
DTP	Page layout software, which is used to design and create

(desk top publishing)	professional looking documents that contain text and graphics.
electronic communities	Groups of people with common interests communicating or interacting with each other in a virtual environment, typically the Internet, rather than in person. Electronic communities are also known as virtual communities, online communities or computer-mediated communities.
email **(electronic mail)**	Messages or letters sent and received in electronic form via the Internet.
exchange project	A project whereby a class in one school exchanges information or resources with a class in another school using electronic communications e.g. email or web spaces. The exchange project can be set up for different purposes, e.g. language learning or cultural exchange.
fair use guidelines	Guidelines that allow educators to use and copy certain copyrighted materials for non-profit educational purposes.
favourites	See bookmarks.
feed **(web feed, channel)**	A web document that is a shortened version of a webpage that has been created for syndication. Weblogs and news website are common sources for web feeds.
feed reader	See aggregator.
field	A category defined by a creator of a database to contain a specified type of information, such as surname, age, gender.
file formats	Formats that a file use. A file format is a particular way to encode information for storage electronically. Common graphic file formats include bmp, eps, gif, jpeg, pcx, tiff, and wmf. Common audio file formats include aif, midi, mp3, mpa, ra, ram, wav, wma Common video file formats include avi, mov, mpeg, mp4, ram, wma, wmv There are many other file formats for text, graphics, audio, video, specialised software etc
firewall	A system designed to prevent unauthorised access to or from a private network. Firewalls can be implemented in both hardware and software, or a combination of both.
flow charts	A diagram consisting of a set of symbols (such as rectangles or diamonds) and connecting lines that shows step-by-step progression through a process or system.
gantt chart	A Gantt chart is a popular type of bar chart that illustrates a project schedule.
GIS **(geographic information systems)**	Software for mapping data to precise map locations.
GPS **(global positioning system)**	Technology that provides extremely accurate position and time information based on data from multiple satellites.
graphic design software	Software for combining graphics and text to communicate an idea or concept.

graphing calculators	A scientific/engineering calculator that is able to display and analyse mathematical function graphs. Graphing calculators can display several lines of text and numbers at a time.
hotlist	See bookmarks.
HTML (hypertext markup language)	HyperText Markup Language is a language used for creating and publishing webpages.
hyperlink	See links.
icons	Pictures or symbols on the computer screen that represent documents, folders and applications.
image editing software	Software for editing and enhancing digital images.
IM (instant messaging)	A type of communications service that enables you to create a private chat room with another individual or limited group of people. Typically, an instant messaging system alerts you whenever people from your private list are online. You can then initiate a chat session with these people.
index	A method of organising information in a database. The index provides a structure, e.g. columns which can be used to facilitate searching for information.
interactive book	A book in electronic format, which has embedded links and animation offering different means of navigation. It may also allow input from the user.
Internet	An international web of computer networks.
LAN (local area network)	A local area network (LAN) is a computer network covering a limited area, like a home, office or small group of buildings such as a school.
library catalogues	Catalogues which contain citations for individual sources the library owns or provides access to, i.e., books, videos, CDs, etc.
link (weblink)	A link or hyperlink is a navigation element in a file, document or webpage which refers to material or content in another location. The link is the predominant means of navigating around the world wide web. When the user clicks on a link, he/she is automatically taken to the other content.
media player	Software for playing back media files in audio or video format. A media player usually comes pre-loaded on most computers. Some files may require a different player, and the user may be directed to download an alternative media player from the Internet.
memory card	A storage device used to store data, such as picture and movie files. Available in a range of sizes, such as 8mb, 32mb, and 256 mb.
message boards	See discussion forums.
mini dv	A video format/medium that stores video digitally rather than in the older analog format. 'Mini' is due to the smaller size of the tape.

modeling software	Software that provides the user with the facility to input data and subsequently manipulate this data to create predictive scenarios and/ or create decision paths. Spreadsheet software is regularly used for modeling purposes in mathematics, science, engineering and finance to determine *what if* situations. Simulation software emulating real life situations is another type of modeling software.
monitoring software	Software that can be installed on a network to monitor computer or network usage, for example, an administrator could control for unauthorised access to the Internet or to specific sites.
MP3	A popular digital audio file format providing near CD quality sound with relatively small file size that enables users download music from the web.
MP3 player	Portable audio device that can play MP3 files.
multimedia	Any combination of text, images, animation, sound and video.
multimedia authoring software	Software that allows the user to create files containing any combination of text, graphics, sound and video.
multimedia presentation software	Software that provides the user with the facility to create slide show presentations which can be shown on a large screen for groups or other audiences.
netiquette	Etiquette acceptable to be used on the Internet.
network	Two or more computers that are connected enabling users to share files and devices (e.g. printers, servers, and storage devices.
newsgroup	A discussion group that is related to one topic.
online collaborative writing tools	Web enabled software resources enabling users to view and collaborate on the creation and editing of text. Open shared web applications are sometimes referred to generically as part of Web 2.0, the next generation of the web.
open source	Software in which the source code is made freely available to be checked, reviewed, maintained and updated by the (software) development community. The availability of numerous developers working on updating and fixing the code means that the software can be free of bugs. Open source software may be supplied or made available license free, but will not provide the user with a support contract.
OS **(operating systems)**	An operating system is the software that manages all the other software in a computer, e.g. Windows XP, Mac OS X, Linux.
password	A secret code for controlling access to a resource or file. The user has to enter the password to gain access to the resource.
patches	Patches are software updates that 'fix' inherent flaws in computer software applications including the operating system.
PDA **(personal digital assistant)**	A handheld device that offers some of the functionality of a computer and which is used to organise personal information such as contacts and schedules, etc. Data can usually be transferred between a PDA and computer by cable or wireless

transmission.

PDF **(portable document format)**	A universal file format that preserves the contents and layout of any document, regardless of the application and platform used to create it. PDF files can be shared, viewed, and by anyone with free Adobe Reader software.
peripheral	Additional hardware that can be hooked up to a computer to enable it to additional tasks, for example printers, scanners, and data projectors.
podcasts	A digital media file, or a series of such files, that is/are distributed over the Internet for playback on portable digital media players and personal computers.
primary sources of information	Original, uninterpreted information. This is information before it has been analysed, interpreted, commented upon, or synthesised.
record	A record is a meaningful collection of database fields representing one unit of storage in a database.
RSS **(really simple syndication)**	A family of web feed formats used to publish frequently updated content such as news headlines, blogs, or podcasts. An RSS document contains either a summary of content from an associated website or the full text.
	RSS content can be read using software called an "aggregator" or a "feed reader." The user subscribes to a feed by entering the feed's weblink into the reader or by clicking an RSS icon in a browser that initiates the subscription process. The reader checks the user's subscribed feeds regularly for new content, downloading any updates that it finds.
	This allows users keep up to date with their favorite blogs, podcasts, radioshows, college lectures etc.
scanner	A device that converts a printed page of text or image into a digital representation that can be viewed and manipulated on a computer.
screen magnification software	Screen magnification software that helps visually impaired people use computers by enlarging the picture on the screen by varying degrees. Some software applications enlarge the entire screen while others only enlarge the area around the mouse.
search engines	Software that enables users to search the Internet using keywords.
secondary sources of information	Secondary sources of information contain commentary on, or discussion about, a primary source. The most important feature of secondary sources is that they offer an interpretation of information gathered from primary sources.
sensors	A device that responds to a stimulus, such as heat, pH, light, or pressure, and generates a signal that can be measured, converted to a voltage level and read by a computer where it is interpreted as a number and can be represented in graphical form.
simulation software	Simulation software offers interactive scenarios, where the user can model or role-play in a real life situation. It is

particularly useful in situations which might be impractical or dangerous in real life, e.g. some science experiments, heart surgery or flying an aeroplane. Educational simulations often provide problem solving scenarios organised as decision paths.

social networking websites
Online communities where one connects, communicates and collaborates with others on the Internet. Communication is accomplished using a variety of methods, such as blogs, instant messaging, email, webcam, chat rooms or discussion forums.

Social networking websites can provide an outlet for creativity and expression. Some social networking sites are devoted to a particular category or specific interest group such as music, meeting friends, educational research, pets or business.

Care must be taken by students when disclosing personal information on social networking websites.

spam
Unsolicited email from unknown sources. It may be marketing electronic junk mail or junk newsgroup postings or it may contain malicious or unwanted material.

spell check
An electronic dictionary, usually part of a word processor, which scans text on the screen and highlights any word it does not recognise. The writer is given the option to correct, ignore or add the word to the dictionary. The spellchecker can be set to offer alternative spellings to the writer.

spreadsheet software
Software that is used to create spreadsheets.

A spreadsheet is made up of data, primarily numeric contained in cells and arranged in rows and columns. Calculations can be performed on the data using formulae.

Spreadsheets may be used for a wide variety of purposes, e.g. gather, analyse, and present survey data and results, maintain household budgets, model *what if* situations. Data and results may be presented in tabular or graphic format.

syndication
The supply of material for reuse and integration with other material, often through a subscription service. In Internet terms, it is a process by which a website is able to share information, such as articles, with other web sites and that allows users view headlines of the latest updates from their favorite blogs and websites all from within an aggregator or feed reader. RSS is a common syndicate format.

text to speech software
Software that converts text from a document or webpage into a computer synthesised spoken sound. This type of software is often used by people with visual impairment or reading difficulties.

touch pad
An alternative means of moving the cursor, It is a replacement for a mouse, and is usually used on laptop computers.

touch screen
A display overlay, which when placed over a computer screen turns it into an input device. Touch screens are useful for young children, and for people who might have difficulty using a keyboard. They are frequently used in museums and other cultural locations for interactive display screens.

track changes	A mark on a document that shows where a deletion, insertion, or other editing change has been made. Users can use track changes to work on the collaborative creation of documents, reviewing, accepting or rejecting changes made by the partner creator(s). The track-changes feature is found in many word processors.
track pad	A touch-sensitive pad used to control the cursor, often found on laptop computers.
unsolicited email	An email from a source not previously known to the user. Frequently unsolicited email is viewed as the main source of spam.
URL **(uniform resource locator)**	See website address.
USB device	A storage device for electronic material also known as a memory stick or flash drive, which can be connected to the USB (universal serial bus) port of a computer. It facilitates the transfer and sharing of resources to and from digital devices and computers.
video conferencing	A synchronized meeting between two or more people, from separate geographic locations using two-way video technology.
virus	A malicious piece of code that can find its way onto a computer. It can control various applications on the computer and can sometimes make the computer inoperable and compromise its security. A virus generally enters the users system through an email attachment and installs automatically when the attachment is opened.
VLE **(virtual learning environment)**	Software that integrates online communications software with content development software enabling users to create and access courses that are delivered partially or entirely via the Internet. Courses may be text-based or in multimedia format.
web 2.0	A term given to the currently developing new generation of the world wide web. The world wide web as we have known it for the last decade (recently termed Web 1.0) is primarily made up of a collection of websites developed using applications on computer desktops and uploaded to the web. For Web 2.0, the web itself is made up of online applications that allow users to create and share content *on* the web *for* the web. For example, wikis and social networking websites. Highlighting some of the evolving changes: Web 1.0 was about reading, Web 2.0 is about writing; Web 1.0 was about home pages, Web 2.0 is about blogs; Web 1.0 was about companies, Web 2.0 is about communities; Web 1.0 was about HTML, Web 2.0 is about XML.
web browser	See browser.
web cam	A web camera (or webcam) is a real time camera whose images can be accessed using the World Wide Web, instant messaging, or a PC video calling application. Generally, a digital camera delivers images to a web server, either

	continuously or at regular intervals.
web feed	A web feed is a document which contains content items, often summaries of news articles or weblog posts with web links to longer versions. Weblogs and news websites are common sources for web feeds, but feeds are also used to deliver structured information ranging from weather data to "top ten" lists of hit tunes.
web quests	An inquiry-oriented activity in which most or all of the information used by students is online. By providing links necessary to complete the quest, the student is able to focus on the material rather than spend time looking for it. Web quests promote critical thinking at the levels of analysis, synthesis and evaluation.
web service	A web service is any piece of software that makes itself available over the Internet.
weblogs	See blogs.
website address (uniform resource locator, URL)	A unique reference locating a file and other Internet resources on the world wide web.
wiki	An open source, editable website. Anyone with Internet access can view the site, and add, edit, or delete content. 'Wiki' is the Hawaiian word for 'quick' or 'fast' signifying the nature of these easy-to-edit sites. Most wikis don't require a password or registration to administer the website but rely on a principle of trust with the users.
wikipedia	A collaboratively edited free online encyclopedia. Entries are created, added to, edited and moderated by users. The wiki community can edit and revise entries, thereby controlling for inaccurate or diversionary entries. It is claimed that the facility to track and control entries provides interested experts with the ability to ensure that information is always accurate. Wikipedia is available in multi-language formats. A wiktionary, a free online dictionary and thesaurus in over 150 languages is currently being created
wifi	See wireless.
wireless	Wireless technology uses radio waves to allow information to pass through the air from one device to another. A computer which has WiFi or wireless networking can access the Internet (usually for a fee) where wireless hotspots are available, thus allowing people who are travelling to continue to use networking capabilities on their computer.
word processor	Software originally devoted to the creation, editing, formatting, storage, revision and printing of text, but currently often including the capacity to include graphs, spreadsheets, and photographs, and to produce sophisticated page-layouts.
worm	A virus-like programme that propagates through the Internet and email and has the capability of being very destructive to the computers that are infected.
XML	A language that contains codes for indicating the style and layout of a document as well as the document contents. XML is

(eXtensible Markup Language)

widely used for publishing on the web and elsewhere. For example, an XML document can generate an HTML, PDF, and Word copies of the same file. This allows the user to have just one master document to update.