



**INFORMATION AND COMMUNICATIONS
TECHNOLOGY (ICT) IN THE
PRIMARY SCHOOL CURRICULUM:
GUIDELINES FOR TEACHERS**

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Foreword

Information and Communications Technology has become an integral and accepted part of everyday life for many people. Technology is increasing in importance in people's lives and it is expected that this trend will continue, to the extent that technological literacy will become a functional requirement for people's work, social, and personal lives. The creative use of Information and Communications Technology (ICT) in education has the capacity to increase the quality of people's lives by enhancing teaching and learning.

Since the launch of the Primary School Curriculum in 1999 there have been significant developments in the use of Information and Communications Technology (ICT) in education. Support for the use of ICT by the Department of Education and Science has resulted in increased availability of ICT in schools, as well as increased opportunities for teacher professional development regarding the use of ICT for teaching and learning. In this context, individual teachers have exploited the potential of ICT to complement their own pedagogical practices, and to extend their children's learning.

The Primary School Curriculum promotes the use of ICT to enhance teaching and learning across the curriculum.

The Introduction to the Primary School Curriculum states:

Technological skills are increasingly important for advancement in education, work, and leisure. The curriculum integrates ICT into the teaching and learning process and provides children with opportunities to use modern technology to enhance their learning in all subjects

Primary School Curriculum, 1999, p. 29

These ICT Teacher Guidelines have been designed to complement the Teacher Guidelines provided with the different subjects in the Primary School Curriculum. In this document, the term Information and Communications Technologies, or ICT, includes computers, computer networking (the Internet and intranet), peripheral devices and multimedia, and the range of assistive technologies available for children with Special Educational Needs. Information contained in this document is premised on the understanding that when effectively integrated into the Primary School Curriculum, ICT can offer teachers and children a powerful suite of tools to support their teaching and learning. Recognising this support role for ICT in the Primary School Curriculum, the four chapters in this document present general guidelines and practical suggestions for the use of ICT by teachers:

- Chapter 1 introduces the aims and general principles of ICT in education
- Chapter 2 outlines key considerations when planning for the effective integration of ICT with the Primary School Curriculum
- Chapter 3 presents an overview of the range of software programs available to schools, and describes educational uses of specific programs

- Chapter 4 discusses and describes the use of the Internet for teaching and learning in the primary school
- The appendices contain a glossary of ICT terms used in the document, and lists of educational resources and references.

Scaffolds are provided within the document to support the reader's understanding of both the role of ICT in education, and the potential of these guidelines to impact local practice.

These scaffolds include:

- references to additional resources and publications in boxed sections within the main narrative
- mini exemplars in the classroom planning section
- suggestions for the use of ICT in the classroom and exemplars of practice in Chapters 3 and 4
- definitional terms in the glossary.

The classroom strategies and exemplars are drawn from a number of sources. Among these were the ICT initiatives and innovations of teachers in twenty schools nationwide who reviewed an earlier version of these ICT guidelines. This pilot project provided the NCCA with valuable feedback on how to improve the usefulness of this document.

The NCCA gratefully acknowledges the assistance of the management, teachers, and children of the schools involved, as well as the National Centre for Technology in Education (NCTE) ICT Advisors based in ten regional Education Centres who managed the project locally.

Information presented in these strategies and exemplars is also drawn from the Schools Integration Projects (SIP). SIP was one of the major initiatives of Schools IT 2000, which was managed by the NCTE. These projects were originally designed to support the development of models of good practice for the use of ICT in education. A descriptive section describing the primary level SIP projects is provided in the appendix to this document. A description of each project can be accessed online at www.sip.ie.

Occasionally in the guidelines, specific software products are named to add focus to the discussion of classroom uses of ICT. The citation of software products within this document should not be interpreted as endorsement or promotion of these resources on the part of the NCCA, but rather as an effort to enliven and enlighten the discussion of teachers' use of particular types of software to enhance teaching and learning in the Primary School Curriculum. The range of educational software available is developing daily; software that is currently being used in schools may be superseded by newer products within a very short time. The NCCA recognises that different software products may be more suitable for teachers and children in different classroom contexts.

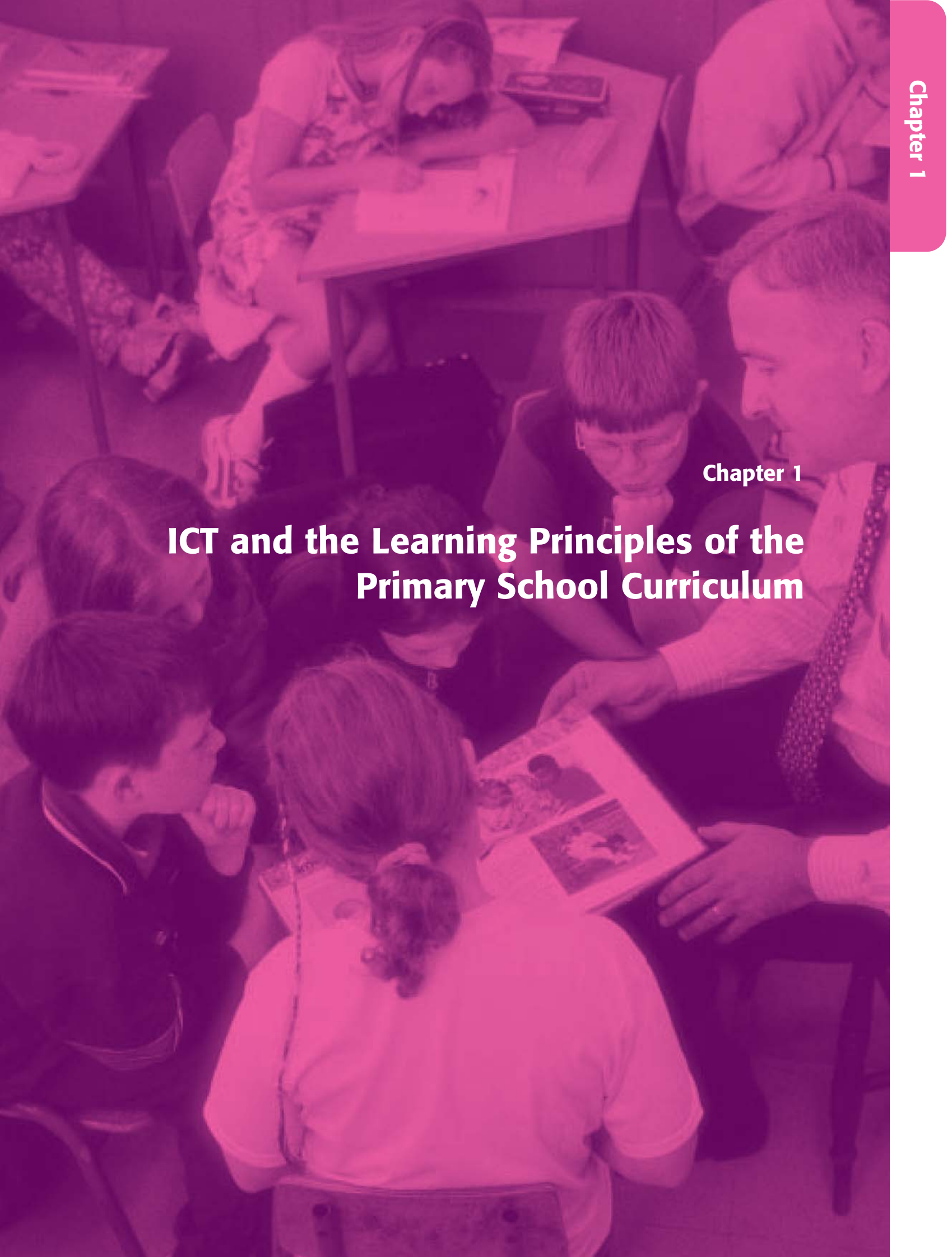
To assist teachers and administrators in evaluating appropriate pedagogical software products for school purchase, a software evaluation template is provided in Chapter Three.

Specific websites are mentioned within the document to support the reader's understanding and to facilitate the implementation of the exemplars provided. Teachers are encouraged to review these websites prior to classroom use with children. To support teachers in selecting and using websites with children, guidance on website evaluation is provided in Chapter 4. A selection of ICT websites is also provided in the Appendix.

The NCCA welcomes feedback from teachers regarding information contained in these ICT Teacher Guidelines. Teachers are also encouraged to share new ideas concerning the integration of ICT within specific subjects in the Primary School Curriculum. The NCCA has begun work on the development of subject-specific guidelines for the use of ICT by teachers and children in primary schools, and plans to make these guidance and support materials available on-line through a designated website, as well as in hard copy.

Chapter 1

**ICT and the Learning Principles of the
Primary School Curriculum**



ICT and the learning principles of the Primary School Curriculum

The Primary School Curriculum presents a vision of education, which is expressed in three general aims:

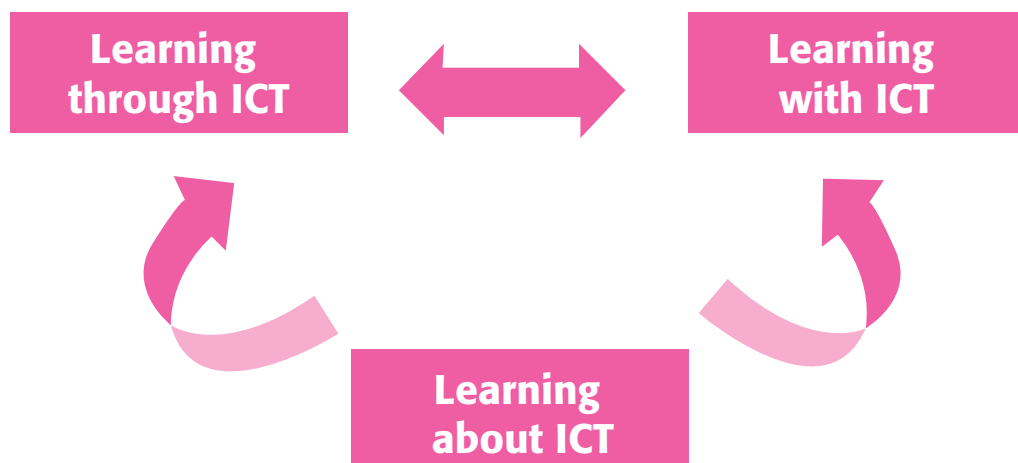
- to enable the child to live a full life as a child, and to realise his or her potential as a unique individual
- to enable the child to develop as a social being through living and cooperating with others and so contribute to the good of society
- to prepare the child for further education and lifelong learning.

To support children's ongoing realisation of their potential as individuals and as members of society, it is important for the primary school teacher to incorporate a range of teaching and learning resources into his or her teaching methods. Guided by the needs of the individual child, the philosophy and content of the curriculum, and the use of tools and resources that can enhance the child's learning, the teacher can design learning experiences that support the broadly stated aims of the Primary School Curriculum.

Context for ICT in the Primary School Curriculum

Information and Communication Technologies (ICT) offer teachers and children educational tools and resources which extend their learning environment. When used to support the aims, principles and objectives of the Primary School Curriculum, these technology tools have the potential to augment and transform classroom learning and teaching.

Using ICT in teaching and learning may be approached in three ways:



Learning about ICT: teachers and children develop skills and knowledge in the potential uses of ICT to support learning.

Learning with ICT: teachers and children use ICT resources to support the classroom curriculum.

Learning through ICT: teachers and children use ICT to transform the process of teaching and learning, learning in new ways.

The use of ICT in teaching and learning in such ways, does not follow a continuum, rather, these functions are inter-related and mutually supportive. Much of children's learning *about* ICT will develop as an integral part of learning *with* ICT.

At the same time, it is acknowledged that learning *about* ICT will be necessary in order to successfully use ICT tools to support the curricular objectives, and to learn in new ways. Learning *through* ICT, which supports the general aim of ICT use in the Primary School Curriculum, places a greater emphasis on the recognition of individual difference, and the use of varied approaches and methodologies in teaching.

The National Centre for Technology in Education (NCTE) provides support for teachers in *Learning about ICT and Learning with ICT* through a range of measures: the Teaching Skills Initiative, Schools Integration Projects, Planning Guidelines, software evaluations, and a range of supportive documentation. www.ncte.ie

Specific aims for ICT use in the primary school include:

- to enable the child to use a range of ICT tools in a relevant curriculum context
- to enable the child to develop and use ICT skills in the attainment of curriculum learning objectives
- to foster the child's confidence in his or her use of ICT, through enjoyable learning experiences
- to develop the child's understanding and practice of the safe use of ICT
- to enable the child to overcome barriers of access to learning resources caused by geographic location, culture, or language
- to enable the child to use ICT to support his or her learning effectively and creatively
- to inform the child's attitudes regarding the role of ICT in society, including the benefits and challenges of ICT use
- to support the development of the child's social skills through cooperative learning and problem-solving.

This chapter explores the role of ICT in supporting the principles of learning underpinning the curriculum, in the context of these aims. It examines how we can align the unique opportunities for learning that ICT affords, with the aims and general principles of the Primary School Curriculum.

The Primary School Curriculum advocates a range of approaches and methodologies for teaching and learning. This section describes ways in which ICT can enhance these approaches and methodologies and provide teachers and children with a powerful learning resource.

ICT and the principles of learning in the Primary School Curriculum

| PRINCIPLE OF LEARNING | TEACHING AND LEARNING STRATEGIES USING ICT |
|--|---|
| <p>The child's sense of wonder and natural curiosity <i>Children's natural sense of wonder at the complexity of the world is a powerful motivation for their learning.</i></p> | <p>The child's sense of wonder and natural curiosity may be engaged by using content-free software. For example, programming software and LOGO with their potential for the dynamic representation of real-world phenomena, can enable children to experiment with procedures and outcomes in a controlled context</p> <p><i>Additional uses of ICT to support this principle of learning include:</i></p> <ul style="list-style-type: none"> • exploring and investigating using the WWW, e.g. NASA site, the classroom of the future, www.cotf.edu • collaborating and communicating with children in other schools, and in other countries in real time. |
| <p>The child as an active agent in his or her learning <i>Learning is an active process of constructing knowledge, rather than simply acquiring knowledge.</i></p> | <p>ICT tools can promote active learning by enabling the child to find, manage, evaluate and use information retrieved from CD-ROMs and websites. By providing access to a range of information resources, ICT can be used to support the child on a journey of discovery that requires decision-making at numerous junctures in the learning experience. The child can discuss his or her findings, and share them with others using presentation and authoring software.</p> |



Additional uses of ICT to support this principle of learning include:

- exploring Web Quests, and Learning quests
- using drawing and paint software to create and edit designs and patterns
- using digital cameras and digital video on field trips to capture images of events for project work, and for active engagement in the wider environment.

The developmental nature of learning

Conceptual development is more of a cyclical than a linear process for the child. The Primary School Curriculum recommends that children receive regular opportunities to revisit concepts, information and skills that have already been acquired.



ICT can support children as it offers opportunities to revise concepts and skills embedded in game-like situations. Content-rich software, that offers tutorials, simulations, and practice problems, can be used effectively for the reinforcement or the revision of concepts.

Additionally, children can use ICTs at different levels, dependent on their stage of development.

- In the infant classes, children may use presentation software to create language experience charts. Later, in the senior classes, they will use this same software to create complex presentations using text, audio, video, and images to create and display their projects.

The child's knowledge and experience as a base for learning

It is a fundamental principle of the Primary School Curriculum that children's existing knowledge and experience should be the starting point for acquiring new understanding.

ICT extends the range of classroom learning tools it offers the teacher and the child. It affords the opportunity to select learning experiences that begin with each child's knowledge and experience, and are thus most meaningful to the child.

Additional uses of ICT to support this principle of learning include:

- Internet resources such as Web Quests offer the child a range of pre-determined websites in a given content area. The child must choose the most appropriate sites to answer the complex questions provided in the Web Quest.
- multimedia tools like video equipment enable children to record and chart their own learning progression
- the combined range of ICT tools enable the teacher and child to maintain a useful record of each child's journey from the unknown to the known in the form of an electronic portfolio.

Environment-based learning

The classroom environment is a vital determinant of the range of learning experiences accessible to children.



ICT extends the child's immediate learning environment, offering opportunities to push learning beyond the confines of the classroom.

Uses of ICT to support this principle of learning include:

- exploratory software, for example problem-solving simulations, enable children to experiment with procedures and processes which might not otherwise be possible
- informational websites available through the Internet provide opportunities for children to learn

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| | <p>about the world beyond their classroom</p> <ul style="list-style-type: none"> • communication technologies such as e-mail and video-conferencing, offer children opportunities to exchange information about their own local environment with others. |
| <p>Learning through guided activity and discovery</p> <p><i>The curriculum underscores the importance of the teacher in providing effective learning experiences for each child. As the gatekeeper for the child's classroom learning, the teacher designs learning experiences that motivate children, offer feedback and advice, and provoke reflection.</i></p> | <p>ICT tools can support the teacher in scaffolding each child's particular path to learning. For example, curriculum-rich software offers the teacher and the child opportunities to structure both the level and sequence of content presented. These software programs typically include options for practice problems or workouts, and provide varied levels of feedback to children based on their performance.</p> <p><i>Additional uses of ICT to support this principle of learning include:</i></p> <ul style="list-style-type: none"> • exploring and discovering information for projects and learning quests, through the use of Webquests, and other guided Internet searches supported by the teacher • learning to use digital equipment and tools supported by the teacher. |
| <p>Learning through language</p> <p><i>The Primary School Curriculum stresses the vital role of language in children's development, and incorporates the use of talk and discussion as a central learning strategy in every Curriculum area.</i></p> | <p>ICT offers the child a motivational context for his or her engagement with content, and thus serves as a powerful stimulus for the child's talk about his or her learning experiences. When the child is given regular opportunities to discuss with peers and teachers what he or she knows and can do when using ICT, technology-enhanced classrooms can provide a powerful catalyst for a child's learning in the primary school.</p> |

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| | <p><i>Additional uses of ICT to support this principle of learning include:</i></p> <ul style="list-style-type: none"> • multimedia tools and software may also provide opportunities for children to document, through audio or video or both, the interaction between language and experience, by recording their learning for later reflection and discussion. |
| <p>The aesthetic dimension <i>Valuing children’s creative response to, and expression of, their own knowledge and experience is an important principle of the Primary School Curriculum.</i></p> | <p>ICT extends the range of opportunities for children’s creative expression by offering a variety of content-free software tools, such as multimedia and art and design software, that support multiple methods of constructing, exploring, and representing knowledge.</p> <p><i>Additional uses of ICT to support this principle of learning include:</i></p> <ul style="list-style-type: none"> • the Internet may offer a suitable site for publishing children’s work on the school website, for viewing by parents and collaborating schools • presentation software offers children opportunities to share their work with others in the same class, within the school, with parents and partner schools, when they create and record examples of their work. |
| <p>The social and emotional dimensions of learning <i>The Primary School Curriculum recognises that the child’s social and emotional development significantly influences his or her success with learning in school.</i></p> | <p>ICT can offer children increased opportunities to experience success with learning. It extends the range of learning experiences afforded to children, offering opportunities to learn through visual, audio, and kinaesthetic media, as well as through text. For example, content-rich software typically offers the child control over the level of information presented, the rate at which it is presented, as well as</p> |

the formats for presenting information (image, text, audio).

Additional uses of ICT to support this principle of learning include:

- ICT offers the child opportunities to develop social skills through turn taking, sharing resources, and helping other children in collaborative project work
- collaborative classroom-based projects which use technology features such as e-mail, chat, threaded discussion, and video-conferencing can be used by children to support one another in the learning process.

The integration of learning

The distinctions between subjects are not relevant to young children, and neither do subject demarcations characterize the nature of learning in the real world. The Primary School Curriculum emphasises the importance of providing opportunities for children to make connections between their learning in different subjects. Authentic learning activities engage children in real-world tasks that transcend the boundaries between subjects.

ICT facilitates authentic learning by offering opportunities for children to experience the outside world within their own classroom. This experience is facilitated by using the Internet to find information, as well as providing facilities for the child to share their findings with others, using a range of communication tools – e-mail, threaded discussions, chats, and video-conferencing.

Additional uses of ICT to support this principle of learning include:

- using content-free software, for example databases and spreadsheets, to enable children to undertake projects with interdisciplinary learning objectives, which emphasise the interconnectedness of knowledge and ideas.

The transfer of learning

Children's ability to apply what they have learned to new situations is one key indicator of the success of their learning. By cultivating each child's ability to transfer learning, the teacher enables the child to overcome the problem of inert knowledge (knowledge that can be recalled when the child is prompted to remember it, but which he or she does not spontaneously use to solve problems). This is a central feature of the Primary School Curriculum.

ICT can support the child's appropriation of new knowledge by offering him or her a range of knowledge representation tools such as concept mapping software, presentation software and database software, which support the child's efforts in structuring his or her learning for later retrieval and application.

Additional uses of ICT to support this principle of learning include:

- the strong multi-sensory presentation style of much of ICT support software can support children's different learning styles
- exploring problem-solving tasks in the controlled environment of a simulation or in an adventure format can support the child's learning by providing him or her with strategies which they can transfer to real life situations
- using a science exploratory simulation software package to investigate the implications of controlling angles, forces, and motion, can aid the child in transferring what he/she has learned to a real-life situation.

Higher-order thinking and problem-solving

Higher-order thinking involves asking questions, defining problems, examining evidence, analysing assumptions and biases, considering alternative interpretations, tolerating ambiguity and so forth.

The Primary School Curriculum promotes these learning experiences for all children across subjects.

The Internet offers teachers and children a wealth of authentic learning resources which, when pre-selected by the teacher, can support the development of children's abilities to question, to analyse, to investigate and to think critically.

Additional uses of ICT to support this principle of learning include:

- critical use of the Internet as an information resource will aid the development of children's abilities to search for, manage, evaluate, use, apply and create information

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| | <ul style="list-style-type: none"> • a variety of online formats, for example, topic hotlists and WebQuests, offer teachers opportunities to structure children's use of the World Wide Web (WWW) for achieving particular learning objectives • content-free software like databases, spreadsheets, and microworlds offer children opportunities to interpret and manipulate data representations. |
| <p>Collaborative learning</p> <p><i>While recognising the importance of learning in a variety of classroom organisational structures, the Primary School Curriculum notes that opportunities for collaborative learning significantly contribute to the child's social and personal development.</i></p> <p><i>When children collaborate, the interactive exchange involves sharing the same goal, and engaging in shared decision-making.</i></p> | <p>ICT can extend and elaborate the possibilities for collaborative learning. It provides opportunities for children to construct knowledge collaboratively when working together on tasks using one computer.</p> <p><i>Additional uses of ICT to support this principle of learning:</i></p> <ul style="list-style-type: none"> • children can work collaboratively when they use communication technologies such as e-mail and video-conferencing to collaborate with partners in learning in different schools or countries • The teacher can organise the classroom to facilitate cooperative learning, by organising children to work in pairs, by promoting turn taking, and group work on different aspects of a project, with some groups completing tasks using ICT. Collaborative work in this way has the advantage of including and valuing the contributions of all children, including those with Special Educational Needs, and leads to positive learning outcomes for all those involved. For example, when working on a project, one group of children may paint, another group may write stories using the word processor, another group may be responsible for the collection of information from |

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| | <p>websites, another group use the encyclopaedia, while another use the digital camera and scanner.</p> |
| <p>Taking account of individual difference <i>The Primary School Curriculum recognises not only individual difference in learning, but factors that pertain to the child's home and community life, and it recommends that children benefit from differentiation in the selection and sequencing of curriculum content.</i></p> | <p>The multiple pathways to learning which different ICT tools offer the child may enable the child to experience success with learning, and thereby positively influence the child's interest in the relevant curriculum subject. The possibilities for differentiation can be particularly supportive for the child with Special Educational Needs.</p> <p><i>Additional uses of ICT to support this principle of learning include:</i></p> <ul style="list-style-type: none"> • content-rich software typically represents information through more than one format (text, audio, image, etc.), and provides options for the pacing and sequencing of information, so that instruction can be tailored to each child's individual learning needs and learning style • the range of content-free software available including writing, multimedia and concept mapping software, also supports children's different learning styles • the possibilities for the teacher to support the differentiation for the specific learning needs of individual children can be aided through the creation of worksheet templates, and reinforcement software for those children who require additional time practising a skill or concept • ICT assessment tools such as electronic portfolios may also engage the child's interest in his or her learning by increasing the transparency of progress records. |

The use of ICT in the primary school is consonant with the principles of learning which underpin the Primary School Curriculum. Additionally, the following principles for the use of ICT in the curriculum should be considered:

- the integration of ICT in the Primary School Curriculum should be directed toward enhancing teaching and learning
- the development of ICT skills should be embedded in learning objectives in the Primary School Curriculum
- planning for ICT use should be at school level and should address key issues including the use of ICT for children with special needs, equality of ICT access for all children, and health and safety when using ICT
- the role of the teacher in planning, supporting, and assessing children's learning with ICT is central to the effective integration of ICT across the Primary School Curriculum
- co-operation between home and school can facilitate the development of a common understanding about the use of ICT as a tool for lifelong learning.

Role of assessment in teaching and learning

The Primary School Curriculum recognises the central role of assessment in the process of teaching and learning.

Assessment is integral to all areas of the curriculum and it encompasses the diverse aspects of learning: the cognitive, the creative, the affective, the physical and the social.

Primary School Curriculum, 1999, p. 18

The teacher assesses the child's learning, both formally and informally as appropriate, to plan for future learning needs and to make changes to teaching approaches as necessary. ICT can support the teacher in constructing a comprehensive picture of the short and long-term learning needs of each child.

The curriculum identifies a varied range of assessment tools to support teachers. ICT tools can also support the teacher in developing a more complete picture of the child's learning needs and progress.

- Reinforcement software may provide the teacher with tools for grading and reporting children's progress in specific curriculum subjects. The instant feedback on progress available to a child using a software programme can be motivational, as well as allowing him or her to see instantly if he or she has mastered a task before moving on to the next stage.
- Database and spreadsheet software may enable the teacher to maintain transparent electronic records of a child's progress, and to communicate this information to the child and his or her parents, teachers and other partners in the teaching and learning process.
- Personal digital assistants (PDAs) are portable devices that can exchange information with PCs and other PDAs. The PDA offers the teacher an additional source of real-time

- assessment information, such as teacher notes, running records, database entries, which contributes to an effective picture of each child's learning experiences in the primary school.
- Electronic or digital portfolios provide durable records of children's work using a variety of ICT tools that include writing, presentation, multimedia authoring, concept mapping, database and spreadsheet software, which may be easily communicated with partners in the teaching and learning process.

Assistive technology

ICT can be an invaluable learning and teaching resource for all children and teachers. Assistive technology can greatly enhance the school curriculum experience for some children.

The term assistive technology refers to the range of technological devices or systems designed to improve the functional capabilities of individuals with disabilities and maximise their quality of life. Some children of primary school age will need such technology in order to lead fuller lives as children and to assist them in their learning. They may need assistive technology to support their communication, interaction, mobility, and general participation within the classroom. For example, a non-verbal child may use a portable device to generate electronic speech, or a child with visual impairment may find magnifying software or screen reader software beneficial in augmenting their learning experience using computer software.

The *Draft Guidelines for Teachers of Children with General Learning Disabilities*, (NCCA 2002) emphasise the potential of assistive technology for primary school children. This document also presents a brief discussion of a range of issues relating to assistive technology at the end of each chapter.

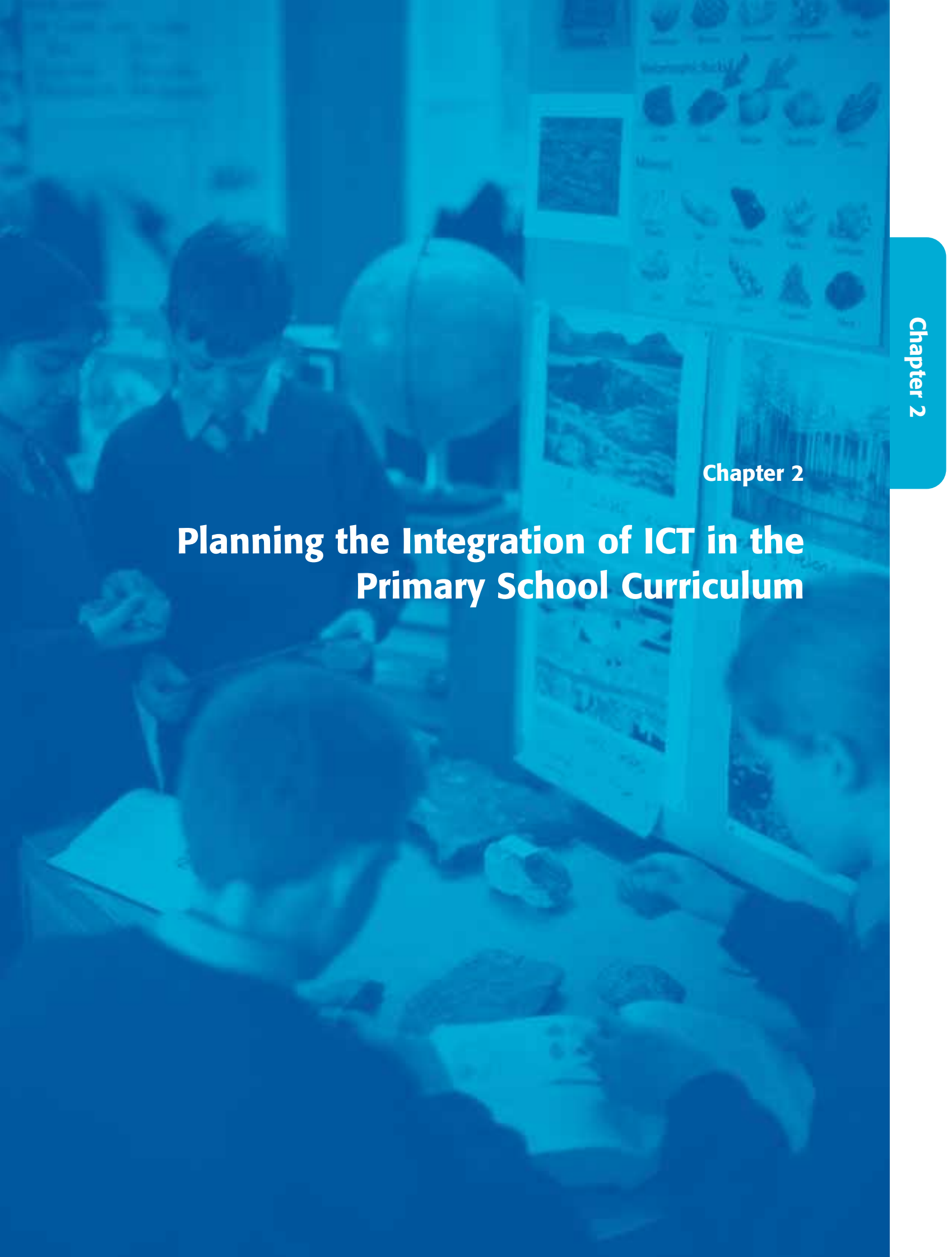
Useful information on assistive technology is available from www.enabletech.ie. This website has been developed as part of the SOLAS project, one of the Schools Integration Projects (SIP) managed by the NCTE, and funded by the Department of Education and Science. The NCTE provide comprehensive guidance on the range and use of assistive technologies both through their website at www.ncte.ie and through publications such as *Special Educational Needs and Information and Communication Technology*.

Conclusion

When used to support learning objectives in the Primary School Curriculum, ICT can positively contribute to children's learning across the curriculum, including their literacy and numeracy skills, higher-order thinking skills (critical thinking, creative thinking, problem-solving) and collaborative and interpersonal skills. Perhaps most importantly, ICT facilitates the differentiation of the curriculum to suit the range of learning needs and styles of individual children. In this way, ICT can offer the teacher a powerful teaching and learning resource helping to ensure that all children can enjoy success as learners.

Chapter 2

**Planning the Integration of ICT in the
Primary School Curriculum**



Planning the integration of ICT in the Primary School Curriculum

The successful integration of ICT within the Primary School Curriculum will depend on effective planning for ICT use by teachers and children. This chapter provides guidelines for planning the use of ICT at school and classroom levels.

In addition to the information provided in this chapter, primary school principals and teachers are referred to the National Centre for Technology in Education (NCTE) resource pack, *ICT Planning and Advice for Schools*, which provides information and advice to help schools prepare and implement an ICT plan. Additional ICT planning resources available on the NCTE website, www.ncte.ie, include a template for developing an ICT school plan, sample software reviews, ICT support for special needs children, informative articles and links to related websites.

Schools should also refer to the Department of Education and Science (DES) publication: *Developing a School Plan: Guidelines for Primary Schools*.

School planning

Planning for ICT in the primary school requires consideration of a number of mutually dependent facets. Though planning commences with the curriculum, what may be achieved with the curriculum at school level is also affected by organisational, personnel and training factors.

This section focuses on two inter-related facets of planning for ICT integration, curriculum planning and organisational planning.

Curriculum planning

Curriculum planning for ICT at school level is concerned with ensuring the successful integration of ICT to support teaching and learning within the framework of the Primary School Curriculum. Through embedding the use of ICT in learning, children will acquire ICT skills in a meaningful and relevant context, rather than in isolation from curriculum content.

Embedding children's use of ICT in the Primary School Curriculum

The Primary School Curriculum makes frequent reference to the appropriate integration of ICT to enhance children's learning in each of the Curriculum Statements and in the Teacher Guidelines. ICT tools that support children's development of learning skills (in accordance with specific strand units) are also identified in the curriculum. When planning for curriculum at school level, teachers can consult the Curriculum Statements for guidance on the integration of ICT in teaching and learning.

Examples of this are presented below:

| | |
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| Subject | History |
| Class/es | First and Second |
| Skills and concepts development | Synthesis and communication |
| Objectives | Through completing the strand units of the history curriculum, the child should be enabled to: <ul style="list-style-type: none"> • communicate an awareness of stories, people, and events from the past in a variety of ways. <i>writing, drama, other media, information and communication technologies</i> |

Learning objectives also include examples of particular uses of ICT, as illustrated in the following examples from the Primary School Curriculum:

| | |
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| Subject | English |
| Class/es | Third and Fourth |
| Strand | Competence and confidence in using language |
| Strand unit | Writing: Developing competence, confidence and the ability to write independently |
| Objectives | The child should be enabled to <ul style="list-style-type: none"> • develop his/her ability to write using information technology – <i>word processing</i> (page 40). |
| Ábhar | Gaeilge |
| Rang | Ranganna a haon agus a dó |
| Snáithe | Léitheoireacht |
| Snáithaonad | Ag úsáid teanga |
| | Ba chóir go gcuirfí ar chumas an pháiste <ul style="list-style-type: none"> • úsáid a bhaint as teicneolaíocht an eolais mar fhoinse léitheoireachta de réir mar a oireann (leathanach 109) |

Additionally, when school planning for curriculum, teachers can plan the learning skills that will be supported by ICT at each level. It will be important to coordinate these areas at school planning level, to provide for continuity of development and to avoid overlap. If children are to use ICT effectively to learn, they need regular opportunities to use ICT tools in the context of their engagement with the curriculum. Based on the learning needs of each child, the learning objectives to be achieved and the ICT tools available, teachers will identify the ICT experiences that children need to enhance their learning in the Primary School Curriculum.

Using ICT to support learning skills

Broadly speaking, ICT tools afford opportunities for children to develop learning skills that are valued in the Primary School Curriculum – higher-order thinking skills, including problem-solving, investigating, evaluating and analysing, critical and creative thinking skills, and communication skills. Statements outlining the learning skills that can be supported by ICT, and the most appropriate curriculum areas and class levels where these can be achieved, can be included in the school plan for curriculum. Some examples are described below.

Critical and creative thinking skills

The following examples describe ways in which ICT can be used to develop children’s critical and creative thinking skills (referred to as higher-order thinking skills) in the Primary School Curriculum. (Further information is provided in Chapters three and four).

- searching for information on the Internet by entering search terms in a search engine, and refining these search terms to retrieve the information required
- evaluating information retrieved from the WWW using a range of criteria, and selecting appropriate information to be used when researching opposing viewpoints on a historical topic (SESE: History)
- using the Internet and e-mail to access copies of archived records, for example by e-mailing the local library or newspaper office. Accessing documentary evidence online through museum archives, gallery collections and newspaper collections worldwide. Examining and analysing this evidence
- describing and recording information on animals and plants along pre-defined fields using database software, and developing complex queries to retrieve information from the database using a range of criteria (SESE: Science)
- recording and sorting survey data on children’s use of ICT tools in their homes using spreadsheet software, and interpreting the survey results using multiple representation formats (e.g., pie charts, bar graphs, scatterplots) (Mathematics)
- developing visual representations of line, angle and shape by using programming software to predict and control a screen image (e.g., Logo) (Mathematics).



Communication skills

The following examples describe ways in which ICT can be used to develop children's communication skills. (Further information is provided in Chapters three and four).

- documenting, editing, and presenting a field trip using a digital camera, or video camera, and multimedia and/or presentation software (SESE: Science)
- recording and editing samples of speech using multimedia software to publish sound files for language learning (Language: Gaeilge/English)
- articulating and exchanging ideas with children and adults in other schools by sending and receiving e-mail, or participating in a threaded discussion (Language: English/Irish) (for example, Gaelscoileanna, and schools in the Gaeltacht may establish school links to communicate in Irish)
- collaborating with children and adults in other schools, organizations, and agencies to compare rivers in different locations using videoconferencing equipment (SESE: Geography)
- selecting examples of children's work across Primary School Curriculum areas, and publishing these work samples in an electronic portfolio that can be shared with parents (and other partners in the learning process) using presentation and authoring software.

Organisational planning

Organisational planning is concerned with ensuring the successful and safe use of ICT to support teaching and learning within the Primary School Curriculum at school level. Organisational factors to be considered in ICT school planning are discussed below.

ICT policy

It will be important for principals and teachers, in consultation with Boards of Management and parents, to develop a policy for ICT use to support the curriculum at school level. The ICT planning resources provided by NCTE will support schools in implementing their school's ICT policy.

Among the considerations when drafting the school's ICT policy are the following:

- how ICT can support and integrate with the Primary School Curriculum
- roles and responsibilities for ICT in the school
- teacher's continual professional development in ICT
- use of software and hardware
- data protection, and copyright issues
- hardware and software audits and inventory
- health and safety in the use of ICT
- the use of the Internet and electronic communications
- ICT experiences for pupils across all classes
- ICT for learning support
- ICT and Special Educational Needs
- technical support and maintenance

These areas are discussed in more detail below.

Curriculum support and integration

- Does the school have a plan for the integration of ICT in teaching and learning in the school as part of the overall school plan?

Schools will outline a vision for the role of ICT in supporting and enabling the school plan for curriculum, including outlining future ICT development plans. It is useful to audit how ICT is currently used as a learning resource in the school and in classrooms to inform future developments.

ICT network and equipment

- Does the school have an inventory of existing ICT resources that can inform plans for the acquisition of new equipment?

An audit of the ICT resources can include: hardware devices, software resources and digital devices, and how these meet the learning needs of all the children in the school. Additional equipment and resources may be required to meet the needs of younger children, and children with Special Educational Needs. Records should be kept of all serial numbers and licences.

ICT storage and maintenance

- Does the school have procedures in place that ensure the safe storage of ICT equipment and software, and provide for routine maintenance and repair of equipment?

Boards of management will need to budget for maintenance of ICT equipment and technical support if required. Storage and safe keeping of ICT resources should also be addressed. Additionally, children should be familiarised with basic care processes for ICT equipment and devices.

ICT co-ordination

- Is there a recognised teacher or group of teachers who assume(s) responsibility for developing ICT capability within the school and ICT integration with the curriculum?

Where there is an ICT co-ordinator, (perhaps a post holder) his or her role should be outlined in the school's ICT plan. All school staff should have a clear understanding of his or her role.

ICT professional development

- What is the level of staff knowledge/expertise in relation to ICT?
- Are the teachers aware of the most appropriate training programmes to support them in incorporating ICT into their teaching?
- Do teachers receive sufficient resources (time, training and support) to develop the skills and knowledge required to effectively integrate ICT in their teaching and learning?
- Do teachers have specific training needs in relation to supporting children with special needs?

The integration of ICT in the curriculum has consequent implications for teacher professional development. The NCTE co-ordinates a range of courses through the Education Centres, which enable teachers to develop their ICT skills to support pedagogical practice in curricular areas and to use a range of computer applications and digital devices.

ICT access

- Do all children and teachers have opportunities to use the school's ICT resources whether in a shared computer lab (for example, timetabled sessions) and/or in individual classrooms (for example, on a rota basis)?

Local factors (for example, equipment, school size) will determine the optimal location of ICT equipment within each school. In the primary school, ICT equipment may be located in a computer lab, in a library or resource room, in the classroom, or a mix of these.

Traditionally, medium and larger schools located computers in a specific ICT lab. However the rising dissatisfaction with the inaccessibility of computer resources to many children and teachers has led to moving computers back into individual classrooms. Recent research on ICT integration suggests that when computers are readily accessible in teachers' classrooms rather than located in dedicated computer labs, the use of ICT by teachers and children becomes embedded in their daily teaching and learning practices.

An additional consideration for schools in relation to equality of access is the 'digital divide'. This refers to the emerging situation where children who have access to a computer in the home, are shown to make greater gains than their peers in relation to learning with ICTs in the school. Teachers will be aware that some children are experienced computer users in comparison with their classroom peers. Children who have access to a computer at home may dominate rather than support when two or more children are sharing a computer. Classroom management strategies and the promotion of positive behaviours such as turn taking and sharing will help to develop social skills and peer support.

Detailed descriptions of the use of ICT in different school locations are provided in the NCTE resource *ICT Planning and Advice for Schools'* www.ncte.ie

Planning for inclusion

- Are policies and procedures in place to support equality of access to ICT resources for all children irrespective of gender, age, cultural background, Special Educational Needs, learning support needs etc.?

It is a fundamental premise of the Primary School Curriculum that the individual learning needs of all children are catered for as adequately as possible. Research shows that using ICT may support the more effective achievement of existing educational goals, especially in relation to children with learning difficulties. Taking cognisance of this, the school ICT plan should include details on the integration of children with special needs, and adequate support for their curriculum needs in relation to software, hardware, assistive technologies, and resources. The question of appropriate use of ICT to support the learning needs of children in the infant classes should also be addressed in the policy.

Additional considerations include:

- the use of ICT in the learning support area
- the in-class supports needs for the child with learning difficulties
- support for the gifted child.

ICT health and safety

- Does the school have a policy describing the support it offers children in developing responsible and informed attitudes regarding their use of ICT in the primary school?

Certain ICT health and safety issues will form part of the general school Health and Safety policy.

Considerations include:

- selection of adjustable desk and chair height for computer equipment to accommodate the needs of children from junior infants to sixth class, and children with physical disabilities
- use of anti-glare screens on computer monitors to guard against eyestrain
- use of protective keyboard covers
- development of guidelines or procedures for children and teachers on care of equipment, hardware, software, and peripherals
- promotion of a culture of 'best practice' among teachers and children when using ICT equipment: for example, not having food and drink near the computer or peripheral devices; care when handling or carrying the digital camera, etc.

Acceptable Use Policy

- Does the school have an acceptable use policy in relation to the use of ICT?

Given the qualitative difference between censorship and guidance, Acceptable Use Policies (AUPs) can help teachers communicate clear guidelines regarding children's use of ICT.

An AUP will provide a framework for safe and responsible use of ICT in the school environment. It will generally contain details on safe and responsible behaviours for children and teachers, procedures for reporting faults or unsuitable materials, and information on protecting the computer from viruses.

Areas for inclusion in an AUP include:

- a policy for responsible use of the Internet at school, formulated by teachers in consultation with pupils, Board of Management, and parents, which will help to ensure understanding about the Internet and the best ways to use it educationally
- additionally, an AUP should include the schools policy on the safe and responsible use of electronic communication, especially in relation to the use of e-mail. Guidelines for children's electronic communications would typically be outlined in the primary school's ICT policy, described in the ICT plan, and communicated to parents and children in the school's AUP.

Whilst there are enormous benefits for children using the Internet, there are potential dangers for children using the Internet unsupervised. The school should aim to offer a supervised and protected web environment for children. It is recommended that schools use filtering software to control access to Internet sites. Additionally, 'walled gardens' or educational portals may be used to control the level of open access to the Internet within the school. Measures such as these facilitate children's use of the Internet as a powerful resource for research, by providing opportunities for children to explore, analyse, and create. The AUP policy should be communicated to parents, to ensure that they fully understand and support the school policy on the use of the Internet in teaching and learning. Parents can support the school policy by making informed decisions about how their children use the Internet on the home computer.

The following section shows some examples of appropriate educational uses of ICT resources for teachers and children, which may be described in a school's AUP.

- Internet access to retrieve information from libraries, databases and WWW sites.
- E-mail access to facilitate long-distance and international communications with peers and experts.
- Participation in Listservs, newsgroups, and chatrooms to gain information on local, state, national and world events.

Inappropriate or unacceptable uses of a school's ICT resources might include:

- copying, modifying, or deleting the files of another child or user
- creating or propagating computer viruses
- claiming responsibility for material created by another person and retrieved from the Internet (plagiarism)
- wilful destruction or pilfering of computer hardware or software.

Electronic communications

Considerations for inclusion in the AUP include:

- children should be aware that they should not reply to unsolicited e-mail.
- children should not provide personal details, name, address etc. in an e-mail
- children should not send personal e-mails from school
- children should be taught not to click on 'automatic reply' e-mail addresses on websites.
- children should be aware of the dangers of viruses from e-mail attachments
- children should not share school user names and passwords with others

Guidance for Electronic communications

The use of e-mail is another avenue to develop children's expression and use of language for different purposes and audiences. Children may typically use e-mail for collaborative projects, to maintain school links with other children, and to access research resources from libraries, museums, embassies etc. The term *Netiquette* refers to the etiquette guidelines for electronic communications. Consideration for the audience is *netiquette's* premise.

Sample guidance for children's use of e-mail in the primary school might counsel children to:

- keep messages short and to the point.
- use a meaningful subject line for the title of your e-mails and discussion threads, so that others will have a clear idea of what your message is about.
- use *asterisks* around a word to emphasize your point, in preference to typing messages in capitals, which is considered the same as SHOUTING!
- address the person's ideas not the person him/herself, when responding to someone else's posting. A personal attack against the author of a posting is known as a 'flame'. Reading an e-mail flame is like listening to an angry person argue.
- refrain from using sarcasm or excessive humour, as your joke may be misinterpreted in an electronic environment.

The publication *Be Wise on the Net: Information and Advice for Schools* produced by the NCTE, provides comprehensive details and guidelines, including sample templates on the creation of Acceptable Use Policies, the evaluation of filtering software and other areas in relation to safe use of the Internet.

www.ncte.ie.

<http://www.ncte.ie/ICTAdviceSupport/TheInternet/InternetSafety/>

Children will also learn to take responsibility for their own safety on the Internet and when using e-mail. Teachers can consult the documents on Internet safety from the NCTE to aid the development of a safety plan on the use of the Internet and e-mail.

NCTE has been involved in collaboration with European partners in the ONCE project (Online Networked Children's Education), to promote Internet Safety for Children. The ONCE project is briefly described in a discussion of Internet safety on NCTE's website, www.ncte.ie/internetsafety, which also has links suitable for children to enable them to understand how to be safe on the web. One of these links is the For Kids By Kids site.

<http://www.fkbko.net/>

Copyright and publishing on the WWW

Many schools publish their own websites, and others would like to do so. Schools should consult publication guidelines to clarify their responsibilities in relation to the publication of childrens work on a web site.

Scoilnet is the educational portal for Irish schools. Information and guidance on publishing school websites is available from the scoilnet site at www.scoilnet.ie.

Electronic information, including material published on disks, CD-ROMs and the Internet, is covered by copyright, in the same way as printed materials are. Copyright coverage is automatic for almost everything created privately and originally after April 1, 1989, whether it has a notice or not. Certain materials can be copied from the Internet for educational use in schools. However, if the pictures are intended for publication on a school website, or if they are shared with another school, permission must be obtained from the website.

Schools should be aware of their responsibilities regarding copyright, and should include clear guidelines for children and teachers on the acceptable use of materials that they retrieve from websites, CD-ROMs and other electronic resources, as part of their school's ICT policy.

In addition, copyright extends to the publication of a child's work, for example, on the school website. It will be necessary for the school to obtain a signed statement of consent from the child's parents, prior to publishing childrens' work or any images of the child on a school website.

Teachers should consult the NCTE planning folders for detailed advice on copyright and licensing in relation to software and electronic resources.

Planning for the Implementation of ICT in the Primary School

The use of software is governed by the type of licence which has been bought. Copyright licence also means that it is illegal to make copies of software, except for a backup copy. However, some software is available free to schools. Some software programs can be downloaded free from certain websites. Teachers can also use evaluation versions of software, which are often made available for promotional purposes.

Data protection

The Data Protection Act (1988) was enacted to deal with issues of privacy in relation to information about individuals held electronically.

The act gives new rights to individuals who are the subjects of electronically recorded data and defines the responsibilities of those who record and store such data. The act also outlines the responsibilities for data controllers. These responsibilities are relevant to individual teachers and school staff in relation to the information on children that is stored in electronic form in school.

Further information on the Data Protection Act is available from the Data Protection Commissioner at <http://www.dataprivacy.ie/>.

ICT review and evaluation

- Are opportunities provided for teachers to evaluate periodically the use of ICT in the Primary School Curriculum, and to modify or revise the school plan accordingly?

Ongoing review of policies is an integral part of planning at all levels. Regular review and evaluation of the use of ICT within the curriculum, analysing areas that require further attention, as well as acknowledging areas of success, will enable teachers and children to maximise their use of ICT to support teaching and learning.

Classroom planning

This section discusses the role of ICT vis-à-vis learning objectives in the Primary School Curriculum, and explores organisational structures for ICT use in the classroom.

The value-added function of ICT

When planning the use of ICT in the classroom, it is important for teachers to identify the role that ICT can play in adding value to teaching and learning across curriculum areas. The use of ICT for children's attainment of specific learning objectives may not always be appropriate. At other times, the use of particular ICT tools can greatly enhance the effectiveness of learning, or add a dimension to learning that was not available before.

For example, word-processing facilitates editing, redrafting and presentation in the writing process in ways that were previously inaccessible using pen and paper. This can be particularly valuable when dealing with a child who has difficulty with writing, as the child can be helped to correct mistakes as often as necessary without the frustration of re-doing the entire piece.

When planning for the use of ICT in the classroom, the teacher will find it helpful to consider the value function of adding ICT, by asking:

How will the use of ICT enhance or extend my teaching and the children's learning as regards the curriculum objectives to be attained?

The following examples show some approaches using ICT, which teachers may use when selecting the curricular objectives for a subject area.

| | |
|-----------------------------|---|
| Subject | Visual Arts |
| Class/es | Infants |
| Strand | All strands |
| Objectives | The child should be enabled to <ul style="list-style-type: none"> • invent and work with shapes that have a variety of characteristics • become sensitive to colour in his/her surroundings • discover that lines can make shapes. |
| Approaches using ICT | Following on from classroom work in this area using real materials, the children can be given the opportunity to create and play with shapes, lines, and colour using paint and draw tools on the computer. |

| | |
|-----------------------------|---|
| Subject | Mathematics |
| Class/es | Third and fourth |
| Strand | Shape and space |
| Strand unit | Lines and angles, 2-D shapes |
| Objectives | The child should be enabled to <ul style="list-style-type: none"> investigate, recognise, classify, and describe the properties of lines, angles, and two-dimensional shapes. |
| Approaches using ICT | Exploring and investigating lines, angles, shapes, using draw and paint programs, using Logo and/or control technology as well as using specific content-rich software programs, and online learning tools. |

Planning the integration of ICT with learning skills

The teacher can use ICT within a curricular area or use a cross-curricular approach to integrate the learning skills. The following examples are not class specific, but suggest some approaches that the teacher may use.

Problem-solving

Plan and implement solutions to problems in a variety of contexts

The child can be enabled to develop this skill by

- using Simulation and Adventure software to solve logical problems
- solving problems from Web Quests and Learning quests. (See chapter four.)

Critical thinking

Develop comprehension skill using a range of texts

The child can be enabled to develop this skill by

- analysing, synthesising, summarising, and evaluating web-based texts and materials retrieved from the Internet and CD-ROMs as part of project work research.

Exploring and investigating

Exploring shape, space, and movement (Maths, Visual Arts)

The child can be enabled to develop this skill by

- using Control technology such as Lego MindStorms
- using Logo to actively explore and create shapes.

Exploring the local environment – developing a sense of change over time (SESE)

The child can be enabled to develop this skill by

- using the digital camera to record images of local landmarks and buildings. Finding archived photographs by using the Internet or searches in the local library, and then comparing the resulting images to develop a sense of the changes over time.

Exploring in music

The child can be enabled to develop this skill by

- using multimedia technology to control, manipulate, or communicate musical information, creating sounds and sequences of sounds
- recording their own voice or the sounds from their environment using a microphone and tape recorder (especially motivational for younger children)
- investigating music and composition using software packages
- researching musical instruments, composers, and a wide variety of types of music from different cultures using the Internet and CD-ROMs.

Explore, respond to and interpret the world visually, Visual Arts

The child can be enabled to develop this skill by

- exploring the work of famous artists on CD- ROM collections and through Internet access to online collections from galleries worldwide.

Using Evidence (History)

synthesis and communication;

imaginative reconstruction of the past and communication of this interpretation to others

The child can be enabled to develop this skill by

- reconstructing the past in story or drama or by constructing models; recording the drama or model using the digital camera or digital video camera to present and communicate to others.

Develop a sense of time and chronology (History)

The child can be enabled to develop this skill by

- using the digital camera to record significant classroom and life events, for example: first day at school, celebrations, special days, sports day, school matches, etc.
- observing and discussing changes over time.

Classroom organisation for ICT use

Different learning activities within the curriculum will necessitate different forms of classroom organisation. Classroom-based ICT offers the potential for children to work independently, in pairs, or in co-operative groups.

Working individually

At times, a child may need to work independently with the computer to revisit concepts previously learned (for example, using reinforcement software in mathematics), or to enrich his or her learning (for example exploratory software) using complex learning tools like simulations. Schedules or rotas help ensure that each child has access to ICT for individualised learning. The availability of specialised supportive software allows the teacher to provide differentiated material to support the learning needs of children in a range of areas. For example, the child requiring learning support may benefit from using software to

support the development of reading and writing skills, while engaging his or her auditory and visual senses. Similarly, the motivational aspect of working independently develops the child's ability to learn independently.

Working in small groups

When working in pairs or in groups of three to five children on projects involving the use of ICT, children may be assigned (or may select) roles including Driver, Navigator, Co-Pilot, Timekeeper, and so forth to support one another in their completion of assigned activities. As children rotate responsibilities and tasks, they learn to accept and share responsibility for the overall work of the group, thus contributing to the development of their social skills and their sense of responsibility towards others. As children work together toward their shared tasks, while also reporting on the status of their individual duties, they benefit from the social interaction and opportunities for language development which are possible in small groups, mediated by the use of ICT tools for learning.



Working with a whole-class grouping

Just as the blackboard or whiteboard enables the teacher to draft ideas, to present rules and concepts, and to diagram information, ICT offers the teacher a suite of representation tools for presenting information to children. Where there is one computer in the classroom, a digital projector connected to the teacher's computer enables the teacher to present information on a large projection screen, on a large-screen television monitor, or white wall, facilitating whole class discussion and participation. Additional uses include creating outlines or concept maps of group ideas, for example, project planning, presenting virtual fieldtrips, representing complex problems or scenarios, providing software tutorials or examples of use, and so forth. Similarly, a scan-converter connected to the teacher's computer and a television affords the opportunity to present and view information on a television screen.

Supporting children's use of ICT

One of the more difficult management issues when working with the whole class is providing help to the child using the computer, while continuing to work with the rest of the class.

Some suggestions which teachers may find useful include:

- finding assignments which are age appropriate, which require minimal help from others
- inviting parents or other adults to help in the classroom
- encouraging children to help each other, i.e. peer tutoring
- organising children into co-operative pairs, or groups
- devising a system where children use objects to communicate when help is needed. For example, the child places flags on the computer: yellow could indicate that help is needed, but that the child can continue to work. A red flag signals an urgent issue, which prevents the child from continuing.

Project-based learning and group work

The children's project work in particular can benefit enormously from ICT – as an information resource, a presentation tool, and a communication tool. Working on a specific project can be enhanced by using ICT, for organisation and editing of work, for recording, and for presenting and disseminating the results. Chapter three provides suggestions for the organisation and presentation of projects using a variety of ICT resources. Project work also lends itself to a cross-curricular approach, and can be beneficial for integration of work in multi-class situations. Teachers can help children work effectively on their projects by

- helping the children to identify the tasks, and helping them allocate duties to individual children
- creating a checklist of tasks to be completed
- guiding the children in the selection of the most appropriate presentation mode for their project – print, multimedia, poster, etc
- making a plan for their project, specifying their need for various ICT tools, for example, computer, scanner, digital camera, the Internet, image editing software, reference software, and so forth
- discussing with the children the amount of time their assignment or project will entail, and scheduling them accordingly
- encouraging children to work on alternative project tasks while not directly using ICT for their project, completing sketches and drawings, and researching using the encyclopaedia
- iteratively reviewing the project – providing regular feedback and grading the project in stages (outline, rough draft, etc.).



Classroom management

The following are some practical guidelines for ICT use in the classroom:

- negotiate and agree rules for appropriate and responsible use of ICT in the classroom
- post a list of 'Ground Rules' for acceptable use in the computer room or beside the classroom computer to remind children of their responsibilities
- set up a rota system to ensure that all children have access to classroom computers
- post a list of frequent commands and shortcuts in a prominent place near the computer
- place a clock or timer near the computer. This will allow children to monitor their time at the computer
- provide children with headphones to reduce the noise levels when the volume is turned on
- prepare a scope for the use of ICT in supporting the elements of project work, to include a schedule to support use by the groups working on the project, for example research time, inputting project work, scanning pictures, formatting the elements of the project etc.
- introduce computer software to one group of children, who in turn can act as peer tutors for others in the class
- assign an older child to use the digital camera with younger children.

Assessment planning

The Primary School Curriculum emphasises that assessment is an essential part of teaching and learning. Some of the ways in which ICT extends the teacher's and children's repertoire of assessment tools are described in this section.

In general, assessment planning needs to take account of

- the use of electronic portfolios
- the use of ICT as an assessment tool
- the use of ICT in recording and analysing assessment information
- the importance of ongoing evaluation and review of the use of ICT in the teaching and learning process both at school and classroom levels.

Using electronic portfolios

If ICT is integrated effectively with the curriculum, children will generate a considerable body of work in different curriculum areas that can be stored in electronic form. An electronic or digital portfolio is a collection of the child's work, selected to demonstrate his or her achievement and or progress in a given area. The child, through discussion with the teacher, can be involved in the selection of content, and setting criteria for his or her own work for inclusion in the portfolio. Assembling electronic portfolios of children's work provides the teacher and the child with a further means of evaluating the child's progress and or attainment.

As children learn to develop and maintain their own portfolios, they can select a representative range of materials reflecting their interests, their ongoing work and achievements: examples of written work, photographs and descriptions of models made in history, designing and making work in science, projects, recorded language activities, digital photographs showing the child working in a group, etc. This will stimulate their interest in using ICT for learning, and foster their ability to assess their own work. However, creating a digital or electronic portfolio has implications for manageability similar to those that apply to paper-based portfolios of children's work. Criteria that are applicable to these are as relevant to electronic portfolios. The portfolios should form a representative sample of children's work that would include some of the best examples. Clear criteria for evaluating the contents of portfolios should be agreed at both school and class level – is the portfolio a portfolio of achievement, progress, best work, etc.

Using ICT assessment tools

Content-rich software programs typically take the form of mastery learning, tutorial, or drill software and incorporate some type of self-test procedure that generates scores. Diagnostic assessments, for example, CoPS (Cognitive Profiling System), are also available on a CD-ROM and offer computer-assisted baseline assessment systems, for evaluating children's abilities in areas such as aural comprehension and phonological awareness. Such tools, used appropriately, may support the teacher in evaluating the child's readiness in a particular area.

Recording the results of assessment

ICT software provides teachers and schools with an efficient and effective means of recording the results of assessment. Assessment records can be stored in a manageable and easily accessible form. This can alleviate the management of such records, as, once a format is created, the teacher can readily update and amend data. Databases and spreadsheets can be used to analyse and extrapolate information on the progress of children in the various areas of the curriculum. As with all child data, these assessment records are subject to the provisions of the Data Protection Act (1988).

Evaluation and review

When planning for the use of ICT to support assessment, ongoing evaluation and review will contribute to refining and developing the role of ICT in the teacher's bank of assessment tools.

Supporting children with Special Educational Needs

When planning for the integration of ICT at school level, additional consideration will be needed in relation to the needs of children requiring learning support and children with Special Educational Needs.

Among the administration areas for consideration are the use of ICT for planning and reporting, the creation of Individual Education Plans (IEPs), and progress reports. Additional curricular considerations include the use of ICT in the mainstream class to support work done in the Special Needs or Resource class. Such support will facilitate access to the mainstream curriculum for children that are withdrawn for a period of time each day. Teachers should consider whether additional individualised resources are required in such situations.

The NCCA *Draft Guidelines for Teachers of Children with General Learning Disabilities* provide support and guidance in relation to the learning needs of these children, and offer ideas on curriculum integration and management using ICT.

Specialised technology, which supports children in accessing the Curriculum is referred to as Assistive Technology. Discussion on the use of particular Assistive technology to access software is presented in Chapter 3.

Using assistive technology to access the curriculum

School level planning for assistive technology

A variety of information and communications technology (ICT) equipment can help children with learning disabilities. Planning for the use of such equipment should take account of the identified needs of each child. There are a number of other planning considerations that have particular relevance for assistive technology. These include:

- funding and grants for assistive technology, including equipment, training and support
- co-ordination of staff, equipment and training
- liaison with parents, therapists and other relevant personnel
- continuous planning, as the child's needs change
- fostering an inclusive positive attitude to children using assistive technology
- storage, maintenance, repair and insurance.

ICT as a teaching and learning tool

The school will need to consider whether the current technology matches the child's learning strengths and needs. Where a child has had an educational assessment, and the use of technology is recommended, the recommendations should be examined to ascertain how they are going to be implemented. The child with Special Educational Needs or in need of learning support may experience more success with the curriculum when familiar equipment is combined with additional or differentiated resources. Multimedia technology,

which can present sounds, photographs, and video, as well as text and graphics on the screen, can support children who have difficulty with the printed word alone in accessing the curriculum. In this way, ICT may allow these children greater access to the curriculum than more traditional methods of teaching and learning.

In particular, where decoding and encoding difficulties create the barrier to learning, the use of appropriate technology can bridge the barrier and empower the child to be autonomous in the learning process. For example, hand-held spell checkers and calculators can support children who have difficulties with sequencing and memorising. Supportive word processing with built-in spell checkers, word lists, and speech feedback can aid the development of literacy. Additional ICT equipment to support children with special needs may include:

- alternatives to the traditional keyboard such as overlay keyboards, concept keyboards, or on-screen grids for children who have difficulty in accessing or controlling the keyboard
- touch screens, with which teachers and children may be familiar from interactive displays in museums, react to the touch of a finger. These can support the child who may prefer to make simple selections on screen, rather than using a keyboard
- predictive word processors support the learner by suggesting words in context, while text to speech software supports the learner by creating text from the spoken word
- spell checkers, glossaries, dictionaries and thesaurus can support dyslexic children and other children by enabling them to check the accuracy of their work
- multimedia programmes which combine text, graphics, moving images and sound, enable the child who has difficulties using a particular sense to use all of his or her senses to reinforce learning
- speech recognition systems enable the child to create text, or to control the computer by voice input
- drill and practice software may support the child who needs to 'over learn' concepts and knowledge and practise skills independently, by presenting the same skills in a range of situations
- assessment software enables the teacher to assess the abilities of children by enabling him or her to focus on individual children, to diagnose the difficulties they may encounter, to analyse their needs and to suggest solutions.

Support and advice for schools in the use of assistive technology to support children with special needs is available through the Special Educational Needs and Learning Support course developed by the NCTE. www.ncte.ie

Additionally, Scoilnet provides a section on support for Special Educational Needs, www.scoilnet.ie

C.D Rom
Na Scoile



Chapter 3

Using Software for Teaching and Learning

Chapter 3

Using software for teaching and learning

A wide range of software is now available for use in education, including applications which were not specifically designed for the education sector, such as 'office' software. Judicious use of software can both enhance and support the teaching and learning process across curricular areas, whether used in specific lessons, or for short or longer-term projects. Additionally, specific software can be used as a tool to develop children's abilities and skills in curricular areas.

The range of available software is growing and changing apace with developments in technology in general. Consequently, the NCCA does not intend to recommend specific software titles in these guidelines, as the recommendations may be rendered obsolete within a short space of time. For this reason, in general, we will mention the type of software and its potential use, rather than promoting specific published titles. Where titles are mentioned, these are used as examples rather than an indication of particular endorsement by the NCCA.

Categories of software

Educational software can, for convenience, be considered in two main categories, content-free software and content-rich software.

Content-free software

Also referred to as productivity software, content-free software includes the range of software applications, which may be used in the performance of cross-curricular tasks. Examples of children's use of content-free software include word-processing software to write a report, multimedia authoring or presentation software to create and display work, multimedia software to produce a video clip, concept mapping software to organise ideas, or simulation software to solve a problem in a controlled environment. Software which facilitates the editing of text, pictures, video and sound also comes under the category of content-free software. In this chapter, where the use of software requires or is enhanced by the use of specific input and output peripheral devices (scanner, digital camera, digital projector, digital video, concept keyboard) these devices are included in the discussion for that software type.

Content-rich software

This category of software refers to applications that contain specific curriculum content and provide the child with opportunities to engage with this content using tutorials, practice problems, assessments, feedback activities, simulations and so forth. Examples of content-rich software include reinforcement software for revising maths concepts, reference software for researching a topic or idea, and exploratory software for simulating a science experiment.

This chapter provides guidance on the evaluation of software for classroom use, discusses uses of content-free software and content-rich software within the Primary School Curriculum, and concludes with a discussion of software for assistive technologies.

Software selection and evaluation

The selection and use of appropriate software to support the curriculum should be an integral part of the overall school plan for curricular areas. In planning for a developmental progression in curriculum at school level, teachers may decide to allocate specific software titles and programs for specific class levels and abilities. Additional planning considerations include providing for balance across curricular areas, and addressing children's particular identified learning needs, or Special Educational Needs. Many software programs lend themselves to a cross-curricular approach, as they offer a range of potential activities. A wide range and variety of software appropriate to different ages, interests, and levels of ability will be necessary to provide this breadth and balance.

The appropriateness of any software title will depend on the curriculum learning objectives that it may support, and the target age range and level of ability of the children. However, the effectiveness of any software program in supporting teaching and learning is determined partially by the quality of the material itself, and partially by how it is used. The purchase of software is both expensive and time consuming. Consequently, before purchasing software, it is important that the teacher familiarises him/herself with what that software package offers, and explores the ways in which it can support teaching and learning. Other considerations that will guide the selection of software include ease of use and installation, and cost and resource implications.

The NCTE has produced a booklet *Evaluating Educational Software: A Teacher's Guide* which will assist teachers in evaluating software. Additionally the Software Central area of the NCTE site contains software reviews.
www.ncte.ie/softwarecentral

Teachers will be aware that many content-rich software programmes are presented in game or adventure format. Children learn through play, exploration and investigation. Though some curriculum software can be used for entertainment purposes, it becomes educational software when it is used in a learning context.

Teachers can use checklists for software in relation to their particular curricular needs at class and school level. The following questions may guide teachers in their selection of educational software to enhance the Primary School Curriculum.

Questions to guide the selection of content-rich software

Educational value of the content

- Does the software content support the objectives of the Primary School Curriculum?
- Can the software be differentiated for different learner needs?
- Does the software present multiple perspectives or methods where appropriate?
- Will the teacher be able to evaluate and assess pupil's work using this resource?
- Is the information provided accurate?
- Are tasks clearly explained?
- Are the questions posed at a level that requires the child to think, to solve a problem, to follow a procedure, or to complete a process?
- Does the learner receive feedback on responses, and on tasks achieved?
- Is the feedback positive, at an appropriate level and useful for the child?
- Is the vocabulary used appropriate for the age group ?
- Is it motivational for the learner?
- Does the software offer something more than printed materials?

Classroom management

- Is the software designed to be used by one pupil or a group, or is it suitable as a whole class activity (using a digital projector)?
- How does it fit into a lesson? (time, content)
- Is it designed for one session at the computer or for multiple sessions?
- Is there off-line follow-up material?

Design and navigation

- Does the software provide opportunities for children to control the pacing and selection of content?
- Is the screen cluttered or busy?
- Are the audio and visual representations of content relevant?
- Are the graphics engaging for the child?
- Are there areas for the child to explore and to interact with the material?
- Is the software/content easy to navigate?
- Does the program provide the option to save settings and stage achieved, or does the child need to restart the programme from the beginning?
- Is there a management system that allows the teacher to track the child's progress?

Compatibility of software with current hardware

- Do your computers have sufficient memory to support this software?
- Is the software compatible with your computer hardware (e.g., operating system)?
- Is the software compatible with your peripheral hardware (e.g., printer)?

Ease of use

- Are directions for installation provided?
- Is the software easy to install?
- Does the software provide a useful menu of help items?
- Does the software come with supporting manuals?
- Is a multiple user licence available?

Support

- Does the software producer/supplier provide a freephone number for customers for support and queries?
- Does the software producer/supplier allow an evaluation period or software on approval?

Content-free software

This section describes the use of the following types of content-free software in the primary school curriculum:

- writing software
- art and design software
- image editing software
- multimedia authoring and presentation software
- concept mapping software
- database software and spreadsheet software
- programming software.

Writing software

Writing software comprises both word-processing software and desktop publishing software. Examples of writing software include:

| Title | Publisher |
|---|---------------------------|
| All My Words Clicker Writer Clicker Grids for learning Clicker 4 | Crick Software |
| Textease 2000 | Softease |
| Inclusive Writer Word Bar | Inclusive Technology Ltd. |
| Writing with Symbols 2000 | Widgit |
| StoryMaker | SPA software |
| Word Publisher | Microsoft (MS) |

Word processing software

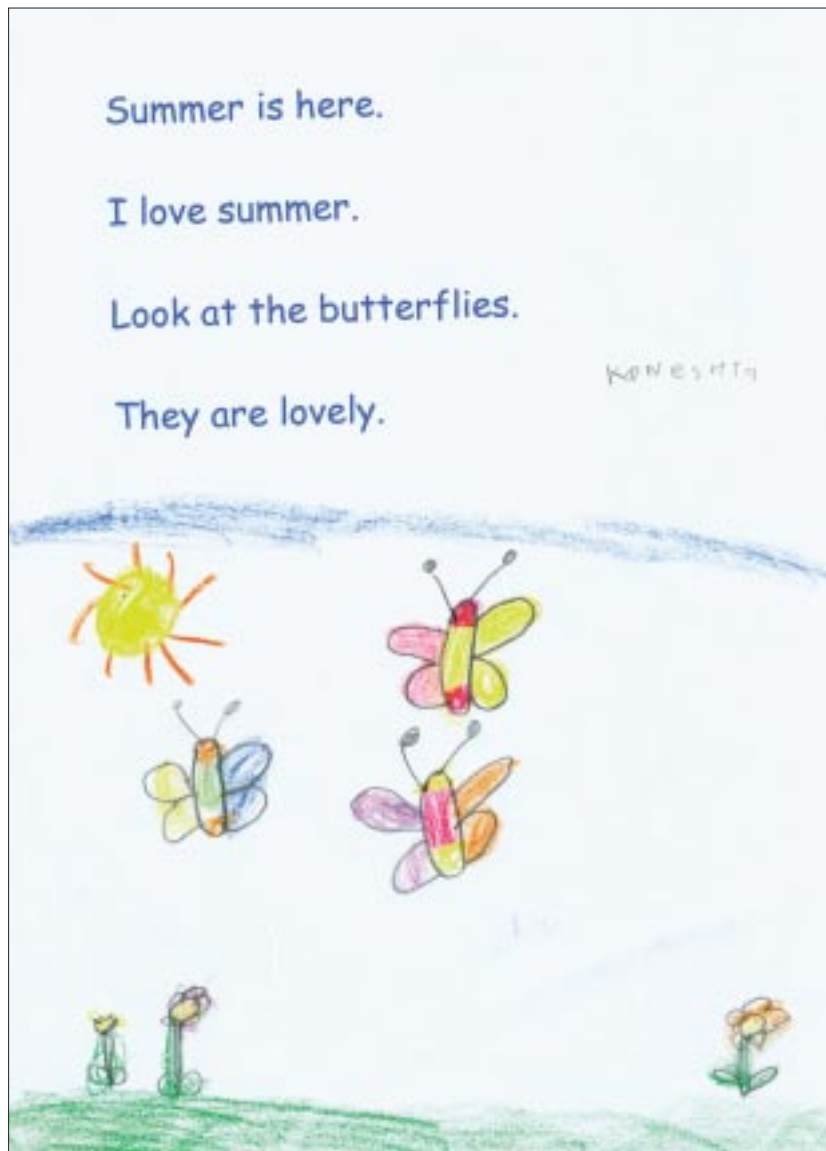
Word processing software enables children to manipulate electronic text in a number of ways including:

- changing the page format
- changing the font type
- changing, enlarging and reducing font size
- typing text
- moving text
- searching for and replacing words
- checking spelling
- inserting pictures or diagrams
- changing text colour.

Throughout the primary school, children can use word processing software to attain increasing levels of sophistication with writing. Children in infant classes can tell their stories to an adult who will type and print their work, allowing space for the children to illustrate their story.

An overlay (concept) keyboard enables young children and children with learning disabilities to manipulate electronic words, pictures and symbols. The concept keyboard can have a positive impact on the development of reading and writing skills of younger pupils, enabling them to improve their understanding of not only text decoding in reading, but also text construction in writing.

In the infant classes, the teacher frequently creates language experience charts, recording the children's oral expression, for collaborative reading. The teacher and children can also create language experience charts using a word processor such as Clicker, or presentation software such as PowerPoint. These materials can be a motivational springboard to the reading and writing process in the junior classes.

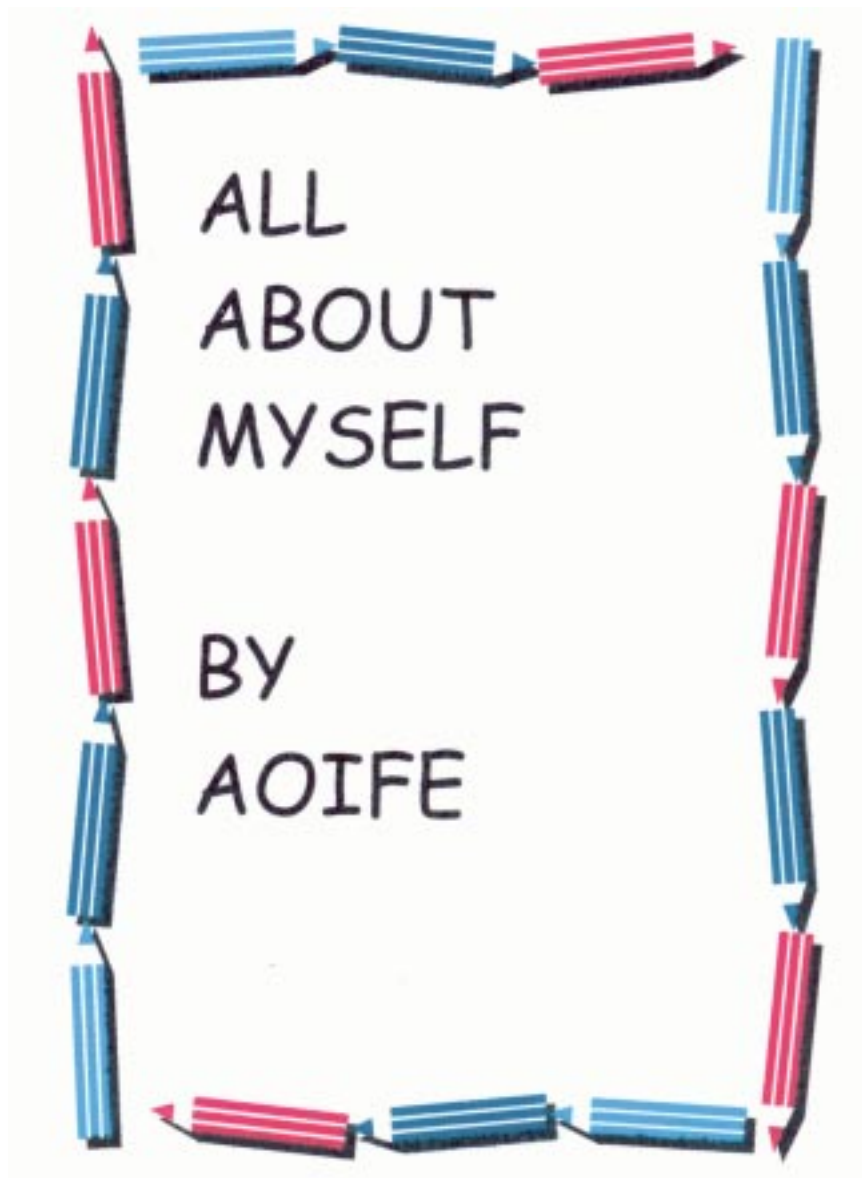


Junior Infants, Scoil Mhuire Gan Smál, Letterkenny

Certain word processing packages provide word banks that can be used to reinforce sight vocabulary. With increasing awareness of sight vocabulary, children can record their own reading using the speech-to-text function in the word processing software package. Creating and reading their own writing can be particularly motivational for reluctant readers and writers. As children gain in literacy and keyboard skills, they can use word processing software to facilitate the sequence of drafting, editing, and redrafting which is at the heart of the writing process in the primary school curriculum.

Further guidance on teaching the writing process is provided in the *Teacher Guidelines for English*, page 76.

The following exemplars describe a developmental progression in use of word processing software from simpler to more complex uses. The first exemplar describes the use of word processing software to develop children's confidence and competence in using language.



Exemplar One

Using word processing software to develop personal writing

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|---|---|
| Language: English | Competence and confidence in using language | Writing: developing competence, confidence and the ability to write independently |
| Approaches and methodologies | Talk and discussion. Drafting and redrafting in the writing process. | |
| Level | This exemplar can be adapted for use with any class level. | |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> • learn to revise and redraft writing • develop his/her ability to write using information technology • decide the quality of presentation in relation to the purpose and audience of a piece of writing • draft, edit and redraft personal writing about his/her family using word processing software, or pencil and paper • enhance the presentation of his/her writing using appropriate graphics and images. | |
| ICT resources | Word processing software (e.g., Microsoft Word, Textease) | |
| Other resources | Pencils and paper (e.g. writing journals) | |
| Preparatory activities | Children will have experience of drafting and redrafting their writing in paper-based format. | |

Methodology

1. The teacher begins by involving children in a class discussion on 'Myself and my Family.' The children discuss ways to structure their ideas. Useful ideas on brainstorming, webbing and storyboarding are provided in the Teacher Guidelines for English, page 79.
2. Children begin the first draft, either by handwriting using pencil and paper, or by typing using word processing software. The teacher supports children by initiating ongoing discussion or conferences at regular intervals during the writing process, and at the conclusion of the work.
3. The children edit their writing, checking for spelling, grammar, punctuation, vocabulary, idiom and so forth, using the paper-based dictionary and thesaurus, or those embedded in the word processing software. (Websites also provide support for writing, e.g., www.dictionary.com.)
4. Children redraft their work formatting the type, style and size of their font, selecting the appropriate page setting (landscape or portrait) and inserting clip art and images to enhance their writing product.

Extension activities

Children could

- add features to the presentation of their work using Art and design software, e.g., page borders and personal drawings
- add images of family members to their writing using a digital camera, or a scanner to copy family photos in an electronic format
- reorder the sequence of sentences in their story (using the cut and paste commands) and give the jumbled story to a group of peers to re-arrange
- print their writing samples and bind them as a class book
- record sound, so that their writing can serve as a talking book
- write additional articles about themselves, which would form part of their personal biography.



Autobiographies

Fourth class, Dromore N.S. Killygordon, Co. Donegal

The next exemplar describes the use of word processing software to develop the emotional and imaginative life of fifth and sixth class children using authentic writing projects.

Exemplar Two

Letter writing as part of a project on the Great Famine using word processing software

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|--|--|
| Language: English | Emotional and imaginative development through language | Oral, Writing: developing emotional and imaginative life through writing and oral language |
| SESE: History | Eras of change and conflict | The Great Famine |
| Approaches and methodologies | <ul style="list-style-type: none"> • experiencing and responding to a wide range of text • fostering the process of writing • writing for different audiences and purposes • developing reference handling and research skills • talk and discussion. | |
| Level | Fifth and sixth classes | |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> • study a period or periods in the history of the local village, town, city area, townland, parish or county <i>the Famine</i> • use imagination and evidence to reconstruct elements of the past • imagine and discuss the feelings and motives of people in the past • communicate this understanding of the past in a variety of ways <i>writing letters and stories based in famine times</i> • write stories and poems (a letter) • express individual responses to literature • express in writing reactions to the experiences of others. | |
| ICT resources | <p>Word processing software (e.g., Microsoft Word) Reference software (e.g., Microsoft Encarta), the Internet, scanner, scanning software and digital camera</p> | |

Other resources

Reference material, Pencils and paper, crayons
(writing journals)

Preparatory activities

Study of the famine or appropriate era in history, practice in drafting and redrafting writing, writing for different audiences.

Methodology

1. During their study of the famine, children adopt a (real or imaginary) character who lived through famine times. Children develop their famine character by researching the famine experience (using reference software) and writing notes on the experiences of this imaginary or real person in nineteenth century Ireland.
2. At the conclusion of their study of the famine, children bring their character to life by drafting a letter that gives voice to that person's famine experience. Ideas may include writing a letter
 - to Daniel O' Connell, asking for help
 - to a landlord, seeking help for passage to America
 - to cousins in America, describing the ravages of the famine
 - to family in Ireland describing your new home in America.
2. Using word processing software, children edit and redraft the content of their letters. They format their text and add images to embellish their letter writing.
3. Children print their letters and share them with their peers.

Extension activities**Integration with Irish**

D'fhéadfadh na daltaí litreacha Gaeilge a chur go dtí a chéile. Is féidir clóanna gaelacha deasa a íoschóipeáil ó www.fainne.org.

Children could

- increase the authenticity of the 'look' of their letters (for class display) by using appropriate fonts, asking an adult to burn the edges of the letter, and so forth
- share their letters with their friends during a small group 'letter reading' circle
- print their writing samples and bind them as a class book
- write authentic letters as a part of their project research, for example, to the local library.

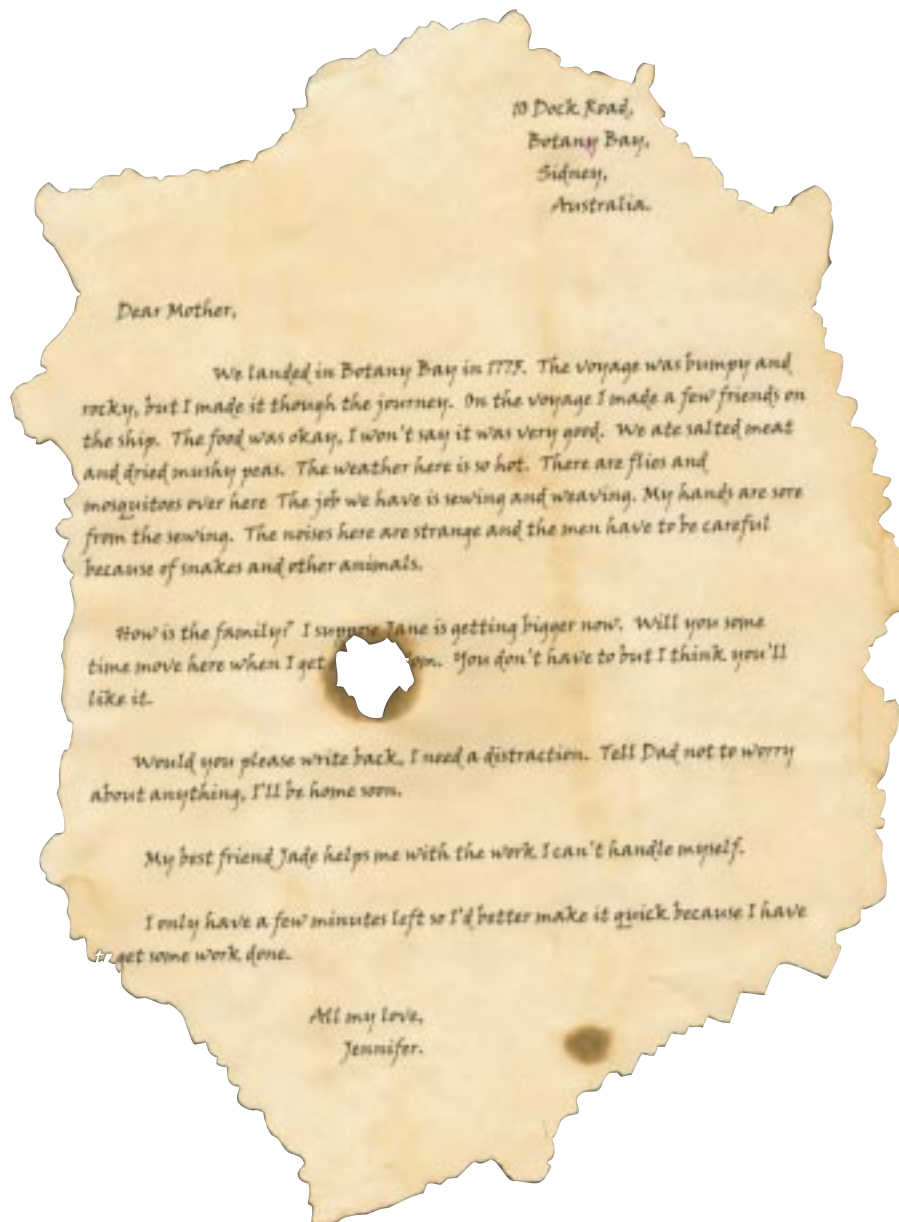
Árasán 2
35 Sráid Hoboken
Nua Eabhrac
Meiriceá

2 Bealtaine 1855

A Sheáin a stór

Conas atá tú a chroí? Tá súil agam go bhfuil tú go maith. Tá mé ag scríobh ó Nua Eabhrac. Tá an áit seo chomh mór. Cuireann sé eagla orm. Conas tá mo mháthair? An bhfuil na prátaí fós lofa...

Síle



Letter Home

Sixth class, Holy Rosary School, Dominican Convent, Wicklow

Desktop publishing software

Desktop publishing software extends the publishing capabilities of word processing software. This software provides children with templates, graphics and other resources to present their writing in attractive and sophisticated formats e.g., for posters, signs, labels, captions, and class or school magazines.

The following exemplar describes the use of desktop publishing software to create a class magazine.

Exemplar Three

Creating a classroom magazine using desktop publishing software

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|--|---|
| Language: English/Gaeilge | Competence and confidence in using language | Writing: developing competence, confidence and the ability to write independently |
| Level | Fifth and sixth classes. This may be adapted for use with other classes with a greater level of teacher support. A whole school magazine may be created with input from all classes. | |
| Objectives | The child should be enabled to <ul style="list-style-type: none"> • write independently through a process of drafting, revising, editing and publishing • take part in co-operative writing activities • choose a form and quality of presentation appropriate to the audience <i>create a class or school magazine</i> • choose a register of language appropriate to the audience. | |
| Approaches and methodologies | Talk and discussion, drafting and redrafting, personal writing, collaborative work, group work, brainstorming. | |

ICT resources

- word processing software (e.g., Microsoft Word, Textease 2000)
- desktop publishing software (e.g., Microsoft Publisher)
- reference software (e.g., Microsoft Encarta) Internet access, digital camera, scanner, scanning software

Other resources

Pencils and paper (e.g. writing journals)
Prepared materials

Preparatory activities

- Children prepare items for inclusion in the magazine.
- Examination of other magazine formats and layout.
- Drafting and redrafting of written accounts.
- Experience with common word processing tasks, for example, creating, saving pages, etc.

Methodology

1. Through class discussion, children generate ideas regarding the content and presentation format for a classroom magazine. News items to be featured might include a description of a class history project, poems authored by children, features on class excursions, class news, jokes, quizzes, and so on.
2. The teacher demonstrates the use of the desktop publishing package, e.g., Microsoft Publisher for children in the design teams.
3. The teacher and children outline the overall scope of work involved in producing a class magazine, and elect each child to a team of three to five children, with responsibility for either producing content for the magazine, or designing the magazine layout.
4. The children gather information using a range of tools and resources including reference software to record facts, class interviews to document children's experiences, and so forth.
5. The design team uses the desktop publishing package to layout and edit the text and images. The layout is presented to the class, and following their feedback, is revised and improved.
6. The contributions of each group are presented in one magazine publication.

Extension activities

Children could

- gain expertise in all phases of producing a class magazine by rotating groups and responsibilities for the production of each new publication
- create regular news updates on school activities, for example, sports, art activities, drama, music, etc.



Knockconan Kids News

Our School Magazine

This is the first edition of KKN (Knockconan Kids News) We started to inform you of the events that took place throughout the year. We will continue KKN throughout the following year. We have gathered up some information on what we have done in the past year. The magazine covers the 8 classes, Junior infants, Senior infants, 1st class, 2nd class, 3rd class, 4th class, 5th class and 6th class. *Mrs. Emyvale* taught in this school for 9 years and has moved to Urbleshaney National School. *Mrs. Emyvale* now teaches in the Infant room. She also takes 4th, 5th and 6th classes for football training. *Mrs. Emyvale* has been teaching 5th and 6th classes for the past few months. *Mrs. Emyvale* has been on sick leave since Easter. There was a Multi-sensory pilot group and many other pupils in our school took part in the Multi-Sensory programme. Everyone in 5th and 6th classes has contributed to this magazine. We hope you enjoy reading KKN.

School Tour

This year 2nd, 3rd, 4th, 5th and 6th are going to Cavan Crystal Maze. We will be going on the 18th of June. Some of the activities we will be doing are orienteering, Folklore, etc. There will be Guides and a Canteen. It cost £17 per child. Cavan Crystal Maze is a series of over 30 mental, physical and skill challenges. We must locate and solve each challenge within a time limit with a Crystal Trophy for the best team at the end of the day. We will be doing an assault course, golf, football, darts, pole run, square Basher, etc. We will also walk up a Giants Grave on Loughleigh mountain, 1119 feet above sea level were you can see 16 counties. We hope that we enjoy ourselves this year.

Knockconan N.S.

Volume 1, Issue 1

June 2001

Special points of interest:

- ☉ Immigrants visit our school
- ☉ Foot and Mouth Crisis in our country
- ☉ Write a book winners in our school
- ☉ Visit to the ICT Fair in Dundalk

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Class Newsletter

Fifth and sixth classes, Knockconan N.S., Emyvale, Co. Monaghan

Writing software: benefits for children

The use of word processing software in the Primary School Curriculum can benefit children by

- helping children to outline and sequence their thoughts
- promoting the use of correct spelling and appropriate grammar
- facilitating edits to, and redrafts of, the child's writing
- motivating the learner to write, as the improved legibility of the writing supports the peer review process and collaborative discussion of the writing
- creating personalised writing records and journals
- enabling high quality presentation of ideas
- supporting children with specific learning difficulties through the use of specialised software, e.g., word prediction, word banks, talking word processors, and word grids in Clicker.

Writing software: teacher uses

Word processing software provides support for teachers in planning lessons, developing activities, and maintaining records.

Teachers can use word processing software to

- complete records of their schemes of work
- create worksheets for all curricular areas
- create supportive material for reading or language-based activities, for example, templates, worksheets or writing frames, with pictures relating to specific topics (for paper or computer based work)
- create word banks to support pupils' writing
- produce flash cards to support vocabulary development for children with Special Educational Needs or younger pupils
- create tests, questionnaires or question and answer sheets for children in different curricular areas
- create signs, notices, labels and captions
- produce a school magazine for parents
- maintain records of children's learning
- create check-lists to demonstrate mastery learning
- document classroom observations
- write letters to parents.

Art and design and image editing software

Art and design and image editing software is now provided as standard software with new computer systems. This type of content-free software contains a range of drawing and paint tools including paintbrushes, spray cans, erasers, and drawing templates (to create shapes) for creating and editing images. These features of art and design software enable children to create effects, and manipulate and modify designs, pictures and patterns. More sophisticated image editing software is supplied with digital cameras and scanners, and can be used to edit photographs and graphics to enhance the presentation of projects, class magazines, etc. In this way, art and design software provides children with enhanced opportunities to explore their creative capacities in a different medium that supports their use of traditional art materials.

Examples of art and design software include

| Title | Publisher |
|---------------|--------------------------|
| Paint | computer package |
| PaintShop Pro | JASC Software |
| Kidpix | The Learning Company |
| Dazzle | SEMERC, Granada Learning |



The exemplars in this section show a progression from simpler uses of basic art packages to the more complex use of image editing tools. The following exemplar shows an approach suitable for junior classes, where the children used a paint program to follow on from and enhance their understanding of colours in the environment and of changes in living things.

Exemplar Four

Using a paint program to focus children's observation skills

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|---|--------------------|
| Visual Arts | Paint and colour | Painting |
| SESE: Science | Living things | Plants and animals |
| Approaches and methodologies | Observing and recording, questioning, exploring and investigating, experimenting with matching colours. | |
| Level | First and second. It may be adapted for use by other classes. | |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> • explore colour using a variety of materials and media <i>match colours and create representations of living objects, using the paint programme on the computer</i> • paint objects chosen for their colour possibilities • recognise and describe the parts of some living things <i>examine the parts of flowers: stem, petal, leaf</i> • understand that seasonal changes occur in living things. <i>grow flower bulbs in the classroom and observe them grow and change</i> | |
| ICT resources | <ul style="list-style-type: none"> • computer paint package, e.g. Dazzle • digital camera • printer • scanner, scanning software | |
| Other resources | Pencils and paper, crayons, flowers grown in the classroom or images of flowers. | |
| Preparatory activities | <p>Integration with SESE : Science; growing flower bulbs in the classroom; looking at flowers and plants grow; looking at parts of the flower.</p> <p>Talk and discussion on colours, colour in the world around us.</p> | |

Methodology

1. The class plant flower bulbs – daffodils and tulips in the autumn. During the winter, the children look after the bulbs, watering them and observing them grow. The children will observe the flowers blooming in the spring time, but notice how quickly they fade away.
2. The teacher initiates a discussion on ways of saving the lovely flowers. Discussion centres around taking photos, painting them, etc.
3. The children paint pictures of the flowers in bloom, showing their favourite flower colours.
4. The teacher scans some of the images. Pictures may be printed out (or displayed onscreen using the digital projector).
5. Discussion continues on comparing the colours of the real flowers with the images. Ask the children whether they can create on the computer the same colours as the real flowers.
6. The children compare and discuss the colours of the flowers and what they will create, for example: green leaves, red or yellow petals.
7. The teacher demonstrates the computer paint package to the class or to groups of children showing how to select the pen, paint brush and spray tools using the mouse.
8. Supported by the teacher, the children try to recreate a flower on screen trying to match the colours.
9. The teacher can display scanned images of the flowers nearby, so that the children can identify and match the colours of stem, leaves and petals using the palette.

Extension activities

Children could

- scan real flowers and observe similarities and differences between the real flower and the scanned image.
- identify different parts of the flower, petals, leaf, stem
- record the growth of other plants and trees using the digital camera to keep a seasonal record
- adapt their scanned painted images of different elements of the environment to record the seasonal changes at appropriate times throughout the year
- scan other examples of finished paintings, and use the computer paint tools to edit and embellish it, for example, add borders or use the spray can.

Image editing software

The following exemplar describes children's use of photo-editing software to modify digital images.

Exemplar Five**Editing digital images using art and design software to create interesting landscapes**

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|--|---------------|
| Visual Arts | Paint and Colour | Painting |
| Approaches and methodologies | Observing and recording, exploring and investigating. | |
| Level | Fifth and sixth classes. It may be adapted with teacher support for use by younger children. | |
| Objectives | <p>The child will be enabled to</p> <ul style="list-style-type: none"> demonstrate the effect of drawing and painting tools, on specific elements of a digital image, using art and design software. | |
| ICT resources | <ul style="list-style-type: none"> image editing software (e.g., Microsoft Composer, or Adobe Photoshop) digital camera scanner, scanning software | |
| Other resources | Pencils and paper, a variety of images | |
| Preparatory activities | <ul style="list-style-type: none"> Children will need to be familiar with using the digital camera. Previous media work on looking at other images and how they have been enhanced is necessary to refine the children's observation skills. The teacher will need to be familiar with the use of image editing software and preparatory mini lessons will be necessary. The teacher demonstrates the features of the image editing software. | |

Methodology

1. Children create digital images of landscapes, using a digital camera or scanner, and save these images to their computer. Alternatively children can download digital images from free photo galleries available on the Internet (www.picturequest.com).
2. Children examine the artistic elements of their image and select the qualities of the image to be modified (e.g., colour, contour, texture).
3. Children use image-editing software to modify their images, producing a number of iterations or modifications to the same image. They can add other features to the landscape, and modify the sky, vegetation and so on. They can incorporate the images into a photographic collage.
4. Talk and discussion will ensue as the children compare how individual children modify the same original photograph in different ways. The resulting images may also be used as the basis for personal writing.

Extension activities

Children could

- create a photographic collage containing all variations or modifications to their original image
- create a new image by combining elements of other images
- use the edited images as a basis for imaginative and creative writing
- extend their artwork by studying the elements of Pop Art, which brought such wide acclaim to Andy Warhol's edited image of Marilyn Monroe
- use problem-based learning approaches to develop their media skills, for example, on the Exploring the Environment site of NASA's Classroom of the Future, the children can use digital editing skills as part of a larger mission.

<http://www.cotf.edu/ete/modules/activities/mars/situation.html>

<http://www.cotf.edu/>

The next exemplar describes children's use of art and image editing software to explore elements of textile design.

Exemplar Six

Creating textile designs using art and design software

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|--|---------------|
| Visual Arts | Print | Making Prints |
| Approaches and methodologies | Observation of colour, shape, design, pattern, exploring patterns in the environment, on furniture, fabric, etc. Talk and discussion. | |
| Level | Fifth and sixth classes. This exemplar can be adapted for use with other classes. | |
| Objectives | <p>The child will be enabled to</p> <ul style="list-style-type: none"> use a computer art program to create original images that are not dependent on clip art <i>create a textile design for clothing or furniture using art and design software</i> demonstrate an awareness of the benefits and drawbacks of using ICT to produce patterns, in a small group discussion | |
| ICT resources | <ul style="list-style-type: none"> computer/s art and design software (e.g., Adobe Photoshop) digital projector | |
| Other resources | Markers, paints and crayons and paper | |
| Preparatory activities | Children will need to be familiar with basic computer applications, and have a familiarity with word processing, and paint and draw icons. Additionally, preparatory exploratory work on using the software would be necessary prior to tackling this project. | |

Methodology

1. Using a digital projector, the teacher demonstrates to the children the use of art and design software to draw and paint. The teacher provides children with a help sheet, which illustrates the layout and functions of the software.

| Number | Tool | Tool uses |
|--------|-------------------|---------------------------------------|
| 1 | Shape selector | To select areas of a pre-chosen shape |
| 2 | Freehand selector | To draw around an irregular area |
| 3 | Magic wand | To select special areas of a picture |
| 4 | Eye dropper | to select colours to paint with |

2. Children use the paint and drawing tools including the symmetry, re-sizing and rotating tools, to create an original image or motif.
3. Children experiment with the effect of duplicating different parts of the motif. Children select the motif image to be duplicated, and they copy and paste the image many times to create a tile effect.
4. Discussion focuses on features of the software used to produce children's patterns, and the benefits and drawbacks of using art software for this activity.

Extension activities

Children could

- compare the effect of using the same motif to create patterns with paper and paint methods, with creations using art and design software
- create a selection of fabric prints as part of an electronic portfolio
- investigate the mathematical foundation for repeating and rotating images to create pattern
- extend their artwork by studying the elements of pattern in artwork by M.C. Escher.

Art and design, and image editing software: benefits for children

Art and design software can benefit the child's learning by enabling the child to:

- create and adapt images by manipulating the drawing and painting tools
- create designs for posters and background displays for projects, and other class work
- explore, invent and construct pattern, line, form and shape using art and design software
- produce, refine and control versions of their work by organising images and space on the page
- develop an understanding of pattern as they learn to control and manipulate the placement and use of, repeated designs
- adapt their own creations and designs when they produce a range of examples based on one design, and to merge designs
- plan, invent and make designs and shapes using two dimensional media
- manipulate shapes that they have created in another medium, e.g. a pattern created on paper and scanned into the computer can be used to create new, innovative patterns
- adapt and work with maps, and so, create their own maps
- collaborate with others in creating images, make decisions about what to do next; react to what they've designed, and share their creations with others
- create collaborative projects when they merge designs created by group members
- develop media literacy skills and the critical understanding that images used in various media may be edited, rather than true representations of reality
- record and save examples of their art and design activities
- store different phases of design for incorporation into their portfolio or project
- display their designs for others either in screensaver programmes, or on print outs.

Art and design software: teacher uses

Teachers can use art and design software to

- produce pictures, posters, signs, displays and charts to support all curricular areas
- produce templates for work in a range of curriculum areas.
- produce templates for children's books and language experience material
- produce classroom materials and activities for exploration of line, shape, angles , etc.
- collate and collect samples of children's work in portfolios.

Multimedia presentation and authoring software

Also referred to as multimedia authoring software, multimedia presentation software allows children to display text, images, animation, video and sound together in the form of a digital slideshow, or multimedia presentation. In an increasingly visually oriented world, children's ability to use multimedia software may help them to make sense of the media that is part of their daily lives.

Text, images, sound, and video may be acquired from many sources, including

- the Internet
- books
- pre-existing photographs and drawings
- original paintings and drawings created by the children.

The facility to scan photographs or pictures using the scanner, to include digital pictures, and the use of a colour printer has meant that multimedia authoring and presentation software can be used to add creativity right across the curriculum. Such image editing software is supplied with digital cameras and scanners, and digital video editing software is supplied with digital video cameras, thereby enabling the user to download images and or video clips for future editing and use. The addition of sound to their projects can also support children's oral presentation skills.

Multimedia authoring projects created using these tools can be presented in a number of formats including:

- print out
- cut onto a CD
- displayed on the computer
- projected on a large screen through a data projector.

Multimedia presentations incorporating text, sound, images and video are enhanced by the use of peripheral ICT equipment, including the following:

- digital camera
- digital voice recorder
- digital video camera
- data projector.

A data projector is an ideal way of ensuring that children and teachers can use the presentation software in a whole-class situation. For example, the teacher could use a slide show to teach new vocabulary as part of the *réamhchumarsáid* as *Gaeilge*. Children's voices can also be recorded on these slides.

Producing a digital video can engage the children in the learning process, helping to develop their visual discrimination skills, and promoting analysis and critical evaluation skills. Making a digital video can engage children actively in their own learning, and can add value to the learning process when used for specific projects rather than for its own sake. Although the creation of animated films may currently appear an advanced use of the medium, developments in software will make the inclusion of moving images a standard feature of presentation work in the future.

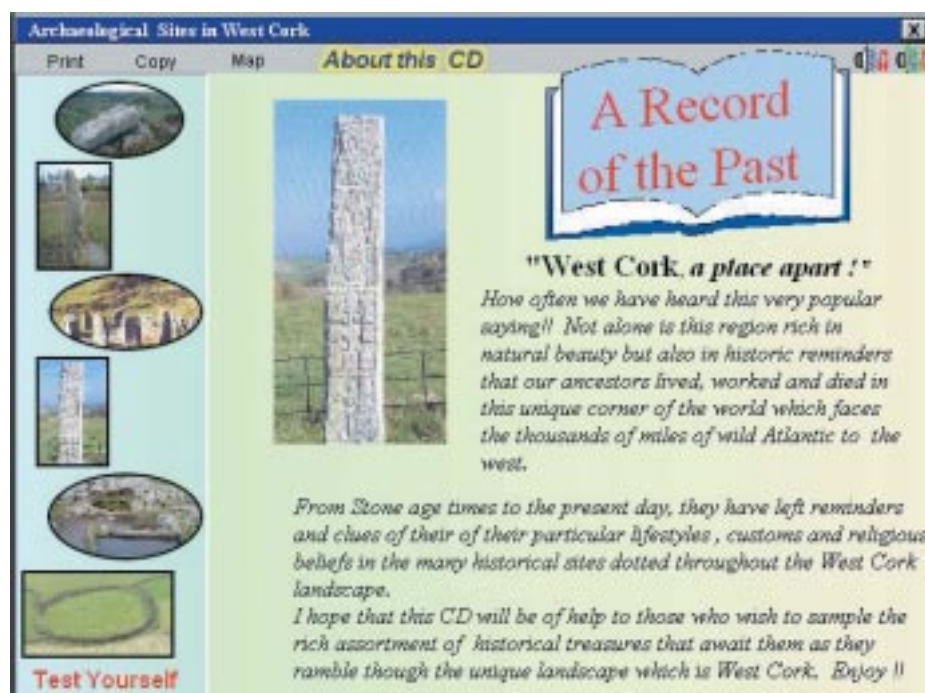
A pilot project using film in the primary school – Fís- successfully showed how teachers and children learned together to create film.

<http://www.dliadt.ie/fis/index.html>

The exemplars in this section show a variety of approaches to both long and short term projects, using a broad range of multimedia authoring tools, incorporating text, audio, and images, and presented in different formats, ranging from book, CD-ROM, website to animation.

Some examples of Multimedia Authoring Packages include:

| Title | Publisher |
|----------------------|---------------------|
| Clicker 4 | Crick Software |
| Hyperstudio | Tag Learning |
| PowerPoint | Microsoft |
| Illuminatus Opus Pro | Digital Workshop |
| Kar2ouche | Immersive Education |



The following exemplar describes the process of creating animations using multimedia presentation software and a digital camera.

Exemplar Seven

Creating animated objects using multimedia presentation software

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|--|-----------------------------|
| Language: English/Gaeilge | Emotional and imaginative development through language | Reading: responding to text |
| Visual Arts | Clay | Developing form in clay |
| Approaches and methodologies | <p>Observing and recording.</p> <p>Designing and making using a range of materials.</p> <p>Exploring and investigating shapes and media.</p> | |
| Level | <p>First and second class, suitable for all classes depending on the activity.</p> | |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> explore and discover the possibilities of clay as a medium for imaginative expression <i>depict a sequence of events in a story using clay or other modelling material to make imaginative hand-sized props</i> respond to characters and events in a story. <i>animate the story using digital images of their hand-sized props and multimedia presentation software</i> | |
| ICT resources | <ul style="list-style-type: none"> computer, multimedia presentation software (MicroWorlds) digital camera printer | |
| Other resources | <ul style="list-style-type: none"> pencils and paper clay or mála | |
| Preparatory activities | <p>Talk and discussion on the story to be animated, comparing story lines, preparatory work on using the digital camera.</p> | |

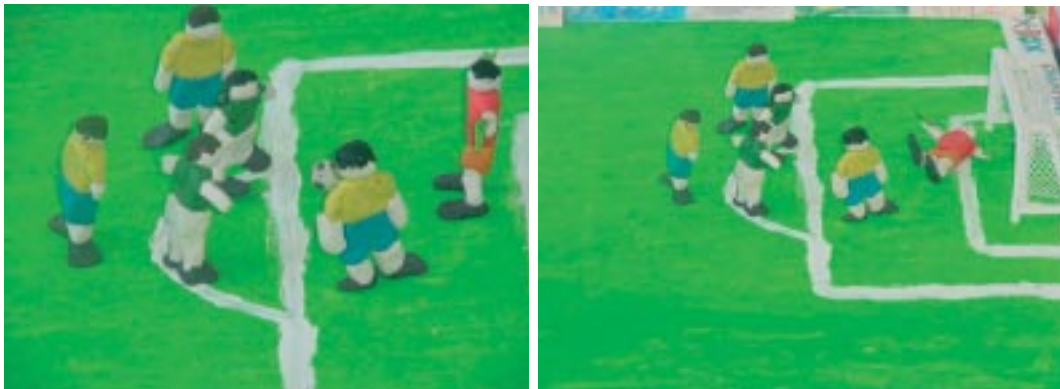
Methodology

1. The children use clay to make models depicted in a story they are familiar with.
2. Using a digital camera, children take several photographs of their clay models. For each photo, children make some changes to their clay model scene.
3. With help from the teacher and other adults, or older children, the children save each of their photographs or digital images on to a series of slides using a multimedia authoring package. Children set the slides to appear in succession in intervals of a second.
4. The slide show is then viewed as a short animation or cartoon. Music can also be added to the presentation for effect. The music may be a recording of a performance by the children. Alternatively, free shared music can be downloaded from the Internet.

Extension activities

Children could

- take regular photos of flowers or plants growing over time, to animate the growth process in a series of slides. This develops the children's understanding of changes over time.



Holy Spirit Boys N.S., Ballymun, Dublin 11

The next exemplar describes a project involving children's use of multimedia presentation software to document the impact of the Great Famine on people in their town. In this example, a wide range of objectives are covered across curriculum areas.

Exemplar Eight

The Great Famine in a West of Ireland town using multimedia presentation software

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|--|---|
| Language: English | Emotional and imaginative development through language | Reading: responding to text |
| SESE: History | <ul style="list-style-type: none"> Eras of change and conflict Politics, conflict and society Local studies Story Life, society, work and culture in the past | <ul style="list-style-type: none"> The Great Famine O'Connell and Catholic Emancipation Buildings, sites or ruins in my locality Stories from the lives of people in the past Life in the nineteenth century |
| Approaches and methodologies | Using multimedia presentation software to facilitate the growth and development of the skills of a historian, including knowledge of <ul style="list-style-type: none"> time and chronology change and continuity cause and effect using evidence synthesis and communication empathy. | |
| Level | Fifth and sixth classes. This exemplar can be adapted for use with other classes. | |

Objectives

The child should be enabled to

- study a period or periods in the history of the local village, town, city area, townland, parish or county
the Famine
- engage in study of aspects of the periods in which political changes or movements have had an important influence on the lives of people in Ireland
O' Connell and Catholic Emancipation
- become familiar with important events in the history of the locality
- actively explore some features of the local environment
the workhouse and the parish church
- use library facilities outside of school
- use evidence that is more complex
research the famine using text resources (history books, reference books, reference software, the Internet) and interviews with people in the locality
- examine and make deductions from simple relevant evidence which informs us about the lives of people in the period
- choose a form and quality of presentation appropriate to the audience
- present ideas that are relevant to the subject in a logical sequence
organize and present his or her research on the Great Famine using multimedia presentation software
- use imagination and evidence to reconstruct elements of the past
- imagine and discuss the feelings and motives of people in the past
- communicate this understanding of the past in a variety of ways
- engage with the writing of one piece over an extended period
- write independently through a process of drafting, revising, editing and publishing
- take part in co-operative writing activities.

ICT resources

- multimedia presentation software (Hyper Studio)
- reference software
- internet access
- digital camera
- digital projector or large screen television
- printer

Other resources

- Reference books and history books
- Pencils and paper

Preparatory work

Class preparatory work includes study of history of the time period, local history studies, contacts with local historians, local library, National Archives, etc.

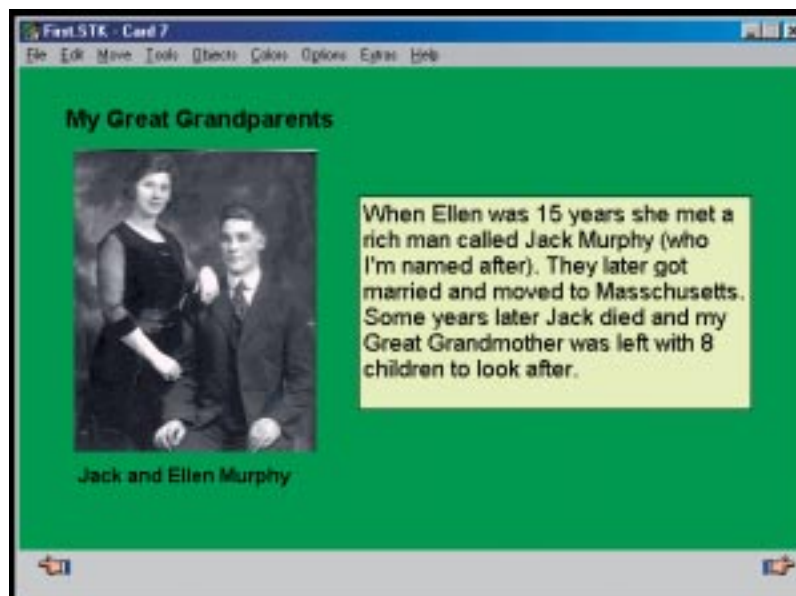
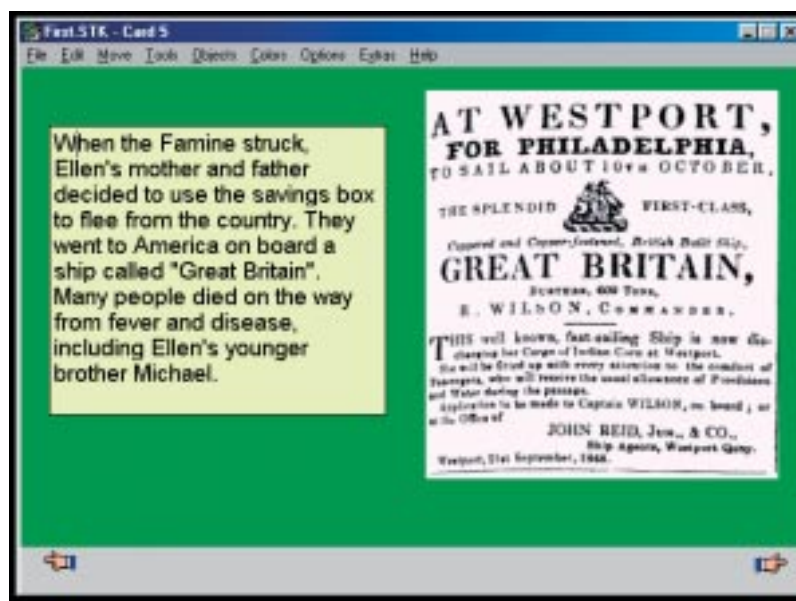
Methodology

1. The teacher introduces the story of Jack, a returned emigrant who wants to find out what life was like for his ancestors during the famine. Each child will research the history of the famine in the locality, and create a multimedia presentation for Jack.
2. The children identify the sites in the town, which are worthy of investigation in relation to the famine, e.g., the workhouse and the parish church.
3. Having identified the sites to be researched, and their history, the class is divided into groups. Each group focuses on a particular area of investigation, e.g., the workhouse, the pauper's grave, the soup kitchen, and the journey to America.
4. Using ICT resources (the Internet, and reference software), library resources, and interviews with local historians, the children begin their research.
5. Each group of children meets to discuss their findings and plan the content of their presentation. Children use the multimedia authoring software to present their research using
 - text
 - graphics from the Internet
 - photographs from digital camera
 - music from CDs
 - movie/video clips from a video camera
 - speech recordings using a microphone.
6. The groups present their findings to the class, the school, the extended school community, and to Jack, with children from each group acting as tour guides for Jack's historic tour of the town.

Extension activities

Children could

- publish their Great Famine presentation on the school website given permission for the use of images from copyrighted sources
- adapt similar projects on local history and local geographical sites, using the National Archives, library and museum resources
- present the project in other formats, CD ROM, or in a book format.



Project Jack's Return, Swinford NS., Co. Mayo.

The following case study illustrates an integrated approach taken over a longer-term period, where the teacher and the class used multimedia authoring software, word processing, digital video editing, and image editing to conduct a local environmental study. This case study presents an overview of the approaches and of the various tasks involved and demonstrates how ICT was used to integrate the subjects of History, Geography, Visual Arts, and English. The project culminated in the creation of a CD-ROM based on the local history of their town. The creation of this project took approximately one month to six weeks of work.

Exemplar Nine

A case study of a local history project: Shopfronts of Clonakilty

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|--|---|
| Language: English | Competence and confidence in using language | Oral: developing competence and confidence in using oral language Writing: developing competence, confidence and the ability to write independently. Reading for pleasure and information |
| SESE: History | Local studies Continuity and change over time | My locality through the ages Buildings, sites or ruins in my locality Homes, housing and urban developments |
| Geography | Human environments | People living and working in the local area |
| Visual Arts | Drawing | Making drawings |
| Approaches and methodologies | <ul style="list-style-type: none"> questioning, observing, investigating and exploring using evidence recording and communicating developing a sense of place and space field work – going around the town to view the shops/premises group discussion – brainstorming | |

| | |
|----------------------|--|
| Level | Classes from 3rd – 6th. All classes can be involved to a varying degree. |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> • hear, discuss and react to local story tellers • ask questions about natural and human features and processes in the environment and their inter-relationships • use library facilities outside of school <ul style="list-style-type: none"> <i>learn to research using various and different media</i> • present ideas that are relevant to the subject in a logical sequence <ul style="list-style-type: none"> <i>realise and discover the importance of planning and preparation</i> • engage with the writing of one piece over an extended period • write independently through a process of drafting, revising, editing, and publishing • choose a form and quality of presentation appropriate to the audience • take part in co-operative writing activities • actively explore some features of the local environment: <ul style="list-style-type: none"> <i>streetscape</i> • present findings using a variety of media • identify, discuss, and record aspects of local human environments which are considered attractive • learn about and come to appreciate and respect the people and communities who live and work in the locality: <ul style="list-style-type: none"> <i>local shop keepers</i> • explore, investigate, and come to appreciate the major features of the built environment in the locality • draw from observation • work independently and as part of a group. |
| ICT resources | <p>Ideally a number of computers in the class room</p> <p>Hardware: digital scanners, CD writer/s, digital camera/s, digital video camera, data projector,</p> <p>Software: Opus Pro, Hyperstudio, MGI Videowave, MSWord, PaintShop Pro</p> |

Other resources

Pen and paper, reference material, local resources,
Colours and paints.

Preparatory activities

Organise children in groups or pairs. Background work on familiarisation with the features and use of the programme. In this case the children learned how to use the programme beforehand – the teacher created a manual guide with 16 lessons to using Opus Pro. This preparation was completed over a number of months.

Methodology

1. Chose topic – in this case the class decided to create a CD on the shop-fronts of Clonakilty.
2. Conduct an initial fieldtrip to choose the shop fronts which will be included, followed by brainstorming to choose the particular premises.
3. Examine other CD ROMs for ideas with regard to layout, presentation, content etc.
4. Plan the project on the blackboard and in copies.
Decision points include: layout of CD, style and look of CD, how many images and videos are needed, how will the tasks be divided among groups?
5. Children conduct research – using questionnaires, books, CD ROMs and the Internet. Involve parents and grandparents in eliciting information on changes in the locality.
6. Devise a questionnaire to elicit information from shop owners. Children conduct this questionnaire on their field trips.
7. Children design layout of pages.
8. Teacher and children take photos and videos of the selected shops and areas for study.
9. The teacher and the children edit photos and videos.
10. The children write up accounts of each of the areas in the survey – using a word processing package. Complete this first separately, drafting and redrafting for later inclusion in the CD.
11. Create the CD ROM using Opus Pro or similar software, inserting links, buttons etc.
12. Insert content and pictures and videos.
13. Design a quiz which goes at the end of the CD ROM
14. Review the work on an ongoing basis.
15. Publish and present CD.

Extension activities

Children could

- conduct local studies on other historical aspects of their local area, for example history of our school, local buildings, economic activity and how it has changed
- study local environmental features
- study local music and culture
- present short or long term projects in the form of a 'book', a magazine, a web site or CD Rom, as appropriate.

De Barra's
Location: 55, Pearse Street, Clonakilty, Co.Cork
Proprietors: Bobby Blackwell
Established: 1950

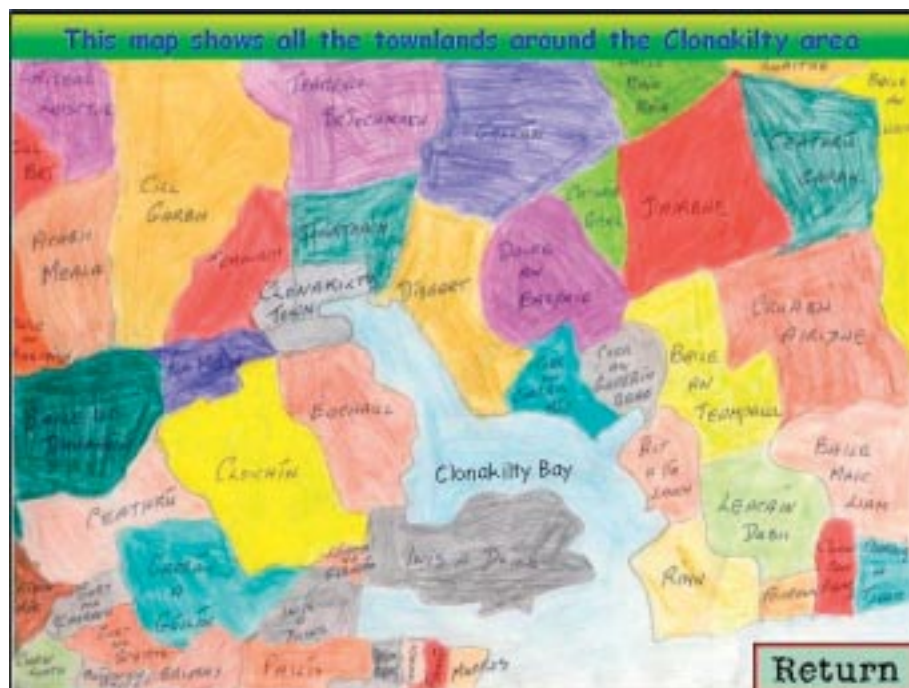
Believe it or Not!
 David Bowie, Christy Moore, Paul McCartney, Louie Stewart, Jimmy Hendricks and Bell X 1 have all played there! In 1941 at the time of First World War the floor was made of dirt then some Polish soldiers said that they would make the floor. The floor was made of blood, sawdust and left over meat! The floor can still be seen today!

History: Before the De Barra's it was a bakery at the back of the De Barra's.

Type of Premises: De Barra's is an old traditional music pub. It is well known for its famous bands and musicians such as Christy Moore and David Bowie.

Designed by:
 Tomás Tuppér was the person who designed and painted this popular pub.

De Barra's have won two awards for flowers.



The following exemplar is presented as a description of a long term project which was conducted over a period of months, in a multi-class situation (3rd to 6th class) in a small rural school. The children create a project on the fields and fences of their local area, covering four modules – Archaeology, Architecture, Folklore, Flora and Fauna. This exemplar shows integration across a number of curricular areas, covering a wide range of content objectives, and provides opportunities for linkage, and further development into art projects. The project on the fields and fences of County Sligo, is a sample of one school's work for a local joint project developed in collaboration with eight other schools and co-ordinated through the Education Centre. The entire project can be viewed at <http://www.sligofieldfences.com>



Batik of the fields and fences project, fifth and sixth classes, Ballinlig N.S., Sligo

Exemplar Ten

A heritage project on fields and fences in Sligo

| Curriculum Area/s | Strand/s | Strand unit/s |
|------------------------------|---|---|
| Language: English/Gaeilge | Competence and confidence in using language | Oral: developing competence, confidence in oral language Writing: developing competence, confidence and the ability to write independently |
| SESE: History | Local studies Story | Buildings, sites or ruins in my locality Feasts and festivals in the past, Stories from the lives of people in the past |
| SESE: Geography | Human Environments The natural environment | Natural environmental features and people The local natural environment |

| | | |
|---------------|----------------------------|------------------------|
| SESE: Science | Living things | Plants and animals |
| SPHE | Myself and the wider world | Developing citizenship |

| | |
|-------------------|--|
| Level | Third to sixth classes |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> • hear, discuss and react to local story tellers <i>develop language and communication skills through interviewing</i> • use library facilities outside of school • learn to revise and redraft writing • choose a form and quality of presentation appropriate to the audience • take part in co-operative writing activities • actively explore some features of the local environment, <i>area of a town or village, ruined building (motte and bailey), site of an old Mass path, prehistoric site, farmyard, field and farm patterns</i> • present findings using a variety of media <i>collaborate with his or her peers to produce a wide variety of materials, stories, poems, art work, drawings, batik, and culminating in material for a book on the project</i> • collect local ballads, stories and traditions • draw from observation • ask questions about natural and human features and processes in the environment and their inter-relationships • investigate and become familiar with some natural features in the local environment <i>explore local sites for geographical, archaeological, historical, social, economic, evidence</i> • observe, identify and investigate the animals and plants that live in local environments • explore local traditions and folklore. <i>develop an awareness, knowledge of and appreciation of their heritage</i> |

Approaches and methodologies

- Developing a sense of place and space, field trips
- exploring and investigating
- interviewing, talk and discussion
- drafting and redrafting, personal writing
- recording evidence, recording stories
- collaborative work, group work
- brainstorming, surveying, measuring
- exploring the lives of people in the past.

ICT resources

Computer in the classroom, word processing software, Hyperstudio, Internet access, digital camera, scanner, scanning software.

Other resources

Art and drawing materials, interviews with local land owners, Pencils and paper (writing journals).
Prepared materials – questionnaires from the project co-ordinator.

Preparatory activities

Set the goal of the project – to record and survey a limited area, one square kilometre in the school locality.
Make contact with local historians, etc.
If it is a joint project, establish contact with other schools to co-ordinate the work.

Methodology

1. Examine the local map/s of the area to select the square kilometre, which would be the focus of study in the project. Gain permission from the landowners to use the land for the study.
2. Make contact with local people who have interest in history and heritage, or local historians.
3. Prepare a list of questions to guide the study on the following areas:
 - Architecture:** e.g. stiles, dry stone walls, mortared stone walls, earthen banks, piers, fencing, ridges, boundaries and how they have changed, wrought iron gates, sheep passes.
 - Archaeology:** middens from the Stone Age, (shell middens), motte and bailey from Norman era, ring forts, famine pot,
 - Folklore:** stories from the past, weather lore, place names, proverbs
 - Flora and fauna:** badger setts, foxes, rabbits, house martins nesting, rookery, starlings, magpies etc.

4. Organise groups in the class and share the areas of the work. Organise requirements for field trips, drawing material, cameras etc.
5. The children study old maps and compare them with maps of today to see what has changed. For example, old ridge patterns show evidence of potato growing in the past. Larger field sizes may indicate that old boundaries have been removed.
6. Organise field trips. The number of field trips required will depend on the size and scope of the project. Record drawings, sketches and digital images on the field trips along with notes, and measurements of any archaeological sites, and of features such as fences, and walls.
7. Some groups interview older people and parents and grandparents and record older people telling stories from the past.
8. Class-based work begins after the material is collected. The children work in groups on different aspects of the project, and write up accounts of each section. The children sketch out drawings of each of the features. They write stories and poems based on stories from the past, and on proverbs. They may record their projects in scrapbooks or note books, and after redrafting, they write these up on the computer.
9. The children scan in their drawings, and artwork, and pictures recorded on field trips using the digital camera.
10. The project can be presented in different formats, a book or magazine, a CD Rom or website. Select the template for page layout. Edit and redraft items for inclusion.

Extension activities

Children could

- extend the project by integrating with visual arts and other activities, for example working with a visiting artist to create a mural or a batik
- explore other facets/themes relating to their local area, music, dance, etc.
- produce and present projects in different formats, using audio, text, images, etc.
- continue to collaborate with other local schools to complete wider projects on other local environmental or historical features, e.g. the local seashore, an old castle etc.

Multimedia authoring and presentation software: benefits for children

The effective use of multimedia authoring and presentation software in teaching and learning helps children to develop a range of skills, and widens their knowledge and understanding of ICT. Multimedia presentation software supports a range of learning styles, and motivates the visual, auditory and active learner.

Using multimedia authoring and presentation software, children can

- plan, develop, refine and produce classroom projects
- improve their writing skills as they practise using the editing tools that make drafting and re-drafting easier
- learn to present project work in an interesting and stimulating way
- investigate the familiar world from new perspectives
- look closely at common objects using close-up photos from a digital camera, and thus engage their curiosity
- create and maintain records of significant events in the classroom or school year using the digital camera
- collect images, sounds and materials for classroom projects when they are exploring in the environment or during a field trip
- develop and refine scripting and storyboarding skills, as they organise their thoughts and ideas to create a multimedia presentation
- be motivated to produce accurate text and refine their presentations for a specific audience, for example, parents
- explore a range of tasks engaging all of the senses, visual, auditory, kinaesthetic, thus catering to their individual learning style
- engage their auditory senses and discrimination by adding sound and comments to multimedia presentations
- use technology to control, manipulate or communicate musical information, creating sounds and sequences of sounds
- enjoy recording their own voice or the sounds from their environment using a microphone and tape recorder
- clarify their thinking as they work through the steps in putting together a multimedia presentation
- learn to work in teams and collaboratively, with each group offering a valuable contribution to the overall finished product
- develop habits of responsibility, through the handling and care of digital equipment
- develop critical analysis skills, for example, using the digital video to record practices for a drama session, and playing them back to analyse it.

Multimedia presentation software: teacher uses

Teachers can use multimedia presentation software as a teaching tool to present material and projects in all curricular areas and to support children's learning right across the curriculum.

Teachers can also use multimedia presentation software to:

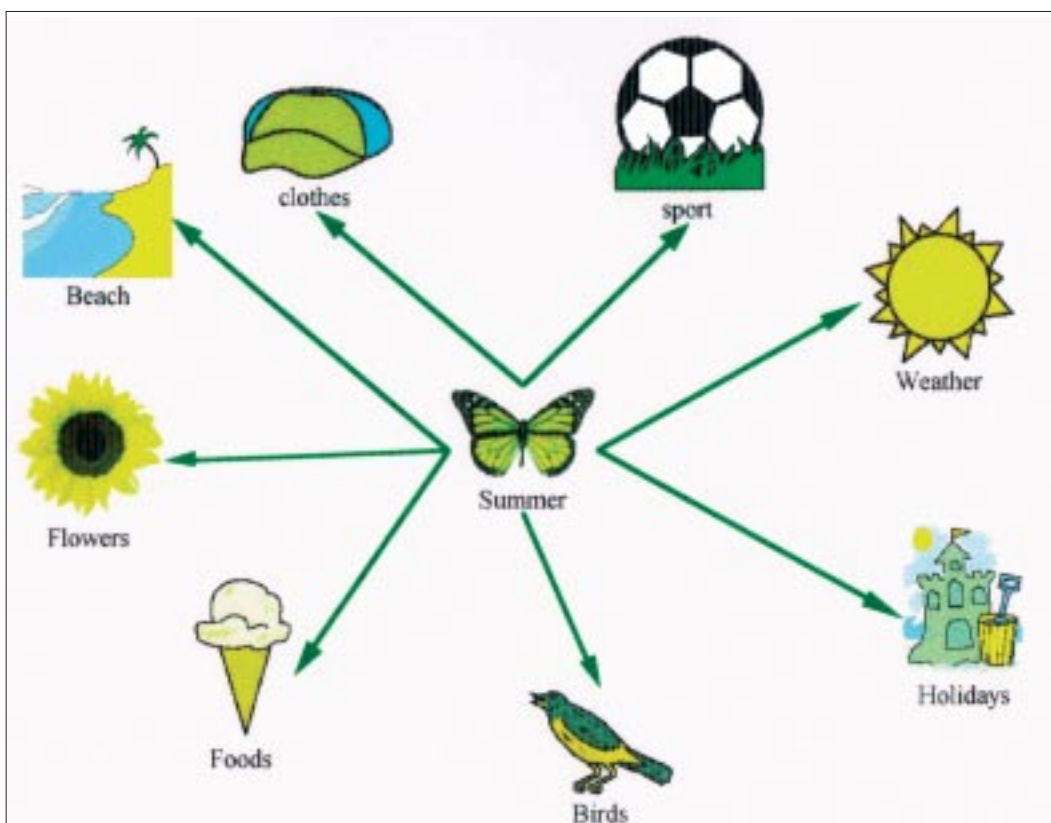
- create language experience materials for infant classes and children with Special Educational Needs
- create multimedia writing frames to support the recording of text, sound and pictures
- create multimedia (talking) books
- create and maintain records of school trips, trails, outings, events and special days using the digital camera and presentation software
- save these records (photographs) on the computer, to be placed into desktop publishing, word-processing and multimedia programs, etc.
- maintain records of significant events in the classroom, and school year: school outings, celebrations, sports days, school matches, school concert, school play, school debates etc. using digital video
- share these records of special school days (sports, concerts, etc) with parents
- use digital images and records for collaboration projects with other schools
- replay significant school events for the whole class, on the video or DVD player, or using the digital projector and screen
- create digital portfolios of pupils' work in different subjects
- evaluate children's work in areas that require close observation, for example, the teacher can record children's performance in physical education using digital video. They can later replay it to analyse areas where improvement in technique can be made
- create teaching materials, for example, by importing pictures from CD- Roms and the Internet into a presentation for a particular topic area
- create slide displays for different subjects, for example, showing the work of a famous artist using images retrieved from online gallery collections
- prepare activities prior to class outings, or create displays for new material.

Concept-mapping software

Concept mapping enables children to create a visual network or web to represent their ideas on a given topic. Also referred to as semantic network software, concept mapping software can be used to assess children's understanding of concepts based on their representations of key ideas, and the inter-relationships or connections they make between these concepts. Concept mapping is recommended in the science curriculum as a tool to assess the child's understanding of scientific ideas and processes.

While specific software packages have been created for concept mapping, a word processing package also contains the necessary concept mapping symbols and arrows. Some examples of concept mapping software suitable for schools include:

| Title | Publisher |
|-----------------------------|---------------------------|
| Inspiration Kidspiration | TAG Learning |
| Draft: Builder | Don Johnson Special Needs |



Literature concept maps, Fifth and sixth classes, Monastery C.B.S., Tipperary

Exemplar Eleven

Responding to a class novel using concept mapping software

| Curriculum Area/s | Strand/s | Strand unit/s |
|------------------------------|---|--|
| Language: English | Emotional and imaginative development through language | Oral language: developing emotional and imaginative life through language Reading: responding to text |
| Approaches and methodologies | Talk and discussion Concept mapping | |
| Level | Fifth and sixth classes This activity may be adapted for similar work on other books with other classes as appropriate. | |
| Objectives | The child will be enabled to <ul style="list-style-type: none"> respond to the elements of fiction (such as setting, character, plot or problem, and solution) as they apply to a specific piece of literature (class novel), using concept mapping software demonstrate their use of oral language to represent concepts (ideas) and attributes (relationships between ideas) in their concept maps. | |
| ICT resources | <ul style="list-style-type: none"> concept mapping software (e.g., Inspiration or Kidspiration) Printer. | |
| Other resources | <ul style="list-style-type: none"> class novel pen and paper for creating paper-based webs. | |
| Preparatory activities | <ul style="list-style-type: none"> Extensive work can be done on concept maps in other subjects – organising thoughts in the writing process, assessing children’s understanding in science. Practise organising ideas for project work, dividing tasks in all a group work Children will initially practise drawing concept maps on paper, but quickly appreciate the benefits of creating them with the ability to edit and revise their concepts. | |

Methodology

1. The teacher introduces the concept mapping software by showing the relationships between the main characters in the novel. The teacher introduces the children to the basic concept symbols and arrows or connectors between concepts.
2. The teacher shows children the Inspiration templates (available with the software), and invites children to use The Language Arts –Literary Web to structure their discussion of the class novel within their groups.
3. Children are divided into groups to create a collaborative concept map of one element of fiction (character, setting, problem, or resolution).
4. Each group presents their concept map to the class by using a digital projector, or by simply rotating from each group to show the group's work to the class.

Extension activities

Children could

- use concept maps to record their ideas at the start point of a lesson in science
- use concept mapping software to structure their ideas when planning a writing activity
- use concept mapping software to indicate cause and effect by organizing their ideas in a concept map representing a flowchart
- explore information on how to build concept maps from websites, for example, <http://www.cotf.edu/ete/pbl2.html>.

Concept mapping software: benefits for children

Using concept mapping software can support children in their learning in the Primary School Curriculum in a number of ways.

It can enable the child to

- generate ideas by brainstorming
- visually represent his or her ideas and concepts in a given topic area, thus aiding the visual learner
- provide a framework to help the child in communicating complex ideas
- organise his or her ideas, and take responsibility for his or her own learning
- plan and organise project work, where there are a lot of elements involved, for example: long text passages, hypermedia, graphics, websites
- integrate new and existing knowledge
- assess his or her own understanding and to diagnose misunderstanding, by comparing earlier maps with later maps on the same concept or idea.

Concept mapping software: teacher uses

Teachers can use concept maps to

- aid their planning in subject and topic areas
- create overviews of linkage within a subject
- provide a framework for the integration of curricular areas (integration web)
- organise classroom management issues such as grouping arrangements, inclusion of children requiring resource teaching or learning support, etc.
- use the child's concept map to evaluate his or her learning in a given topic area
 - by examining the child's concept map and comparing it with earlier maps made by the same child on the same topic
 - by comparing it with other maps by the same child which represent different perspectives
 - by comparing it with curriculum objectives
 - by comparing it with an expert's (teacher's), concept map.
- assess the child's progress by counting the concepts and relationships between concepts, to determine the breadth and depth of child knowledge
- keep records of children's developing knowledge or concepts in a particular curricular area.

Spreadsheet and database software**Spreadsheet software**

Spreadsheets are programs that are designed to facilitate the organisation and manipulation of numbers and were originally designed for use in accountancy. Although spreadsheets can contain database elements, spreadsheets offer additional features, including mathematical functions and graphing functions.

Some examples of spreadsheet software include:

| Title | Publisher |
|--------------|------------------|
| 2Investigate | 2Simple Software |
| Excel | Microsoft |

The following exemplar demonstrates children's use of spreadsheet software to analyse and illustrate the results of a class survey.

Exemplar Twelve

A class survey in Maths using spreadsheet software

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|---|------------------------------------|
| Mathematics | Data | Representing and interpreting data |
| Approaches and methodologies | Talk and discussion, communicating and expressing, Collecting, organising and handling data | |
| Level | This exemplar can be adapted for use with any class level. | |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> represent mathematical ideas and processes in different modes: verbal, pictorial, diagrammatic and symbolic compile and use simple data sets <ul style="list-style-type: none"> <i>collect, and enter data in a spreadsheet, using spreadsheet software</i> <i>represent data in the spreadsheet using the appropriate graph (e.g., pictogram, single and multiple bar chart, simple pie chart, scatterplot), read and interpret graphical representations of data, created using the spreadsheet software.</i> | |
| ICT resources | <ul style="list-style-type: none"> spreadsheet software (e.g., Excel, Junior Viewpoint) computer, printer. | |
| Other resources | Paper-based surveys, blocks, Unifix, etc. pencils and paper. | |
| Preparatory activities | Children will have practise using data, gathering data, organising data, representing their findings using unifix or blocks, making graphical representations on paper. | |

Methodology

1. The teacher divides the class into a number of small groups. Each group will collect data from the whole class on a different question, e.g., preferred pastime, preferred music artist, eye colour, and so on.
2. The groups design a simple questionnaire or data collection instrument. In order to ensure that the results are manageable, options for each category must be limited.
3. Each group surveys all children in the class (including members of their own group).
4. Groups enter the data for their category on a spreadsheet, and create a pictorial representation, e.g., pie chart, bar chart.
5. Each group presents their data set to the class. Large group discussion follows.

Extension activities

Children could

- survey the class using additional questions, and add the new data to the existing data sets
- survey the class using the same questions, at a later time and compare the new data with the previous data set
- feature the results of the survey on the class magazine (created using desktop publishing software)
- create a multimedia presentation to present the data to the large group
- Complete other topics such as
 - results of an activity in Science, e.g., grouping animals in a habitat study according to the number of legs each has
 - collecting and representing data on traffic surveys in Geography
 - survey of a streetscape in Geography, e.g., how many pubs, how many shops
 - survey of attitudes to a topic in SPHE, e.g., smoking.

Spreadsheet software: benefits for children

Spreadsheet software can support children's learning in the primary school curriculum by

- helping the child to develop reasoning skills as he or she makes hypotheses and carries out research to test them
- enabling the child to search for and investigate mathematical patterns and relationships
- providing tools that the child can use to synthesize and analyse large amounts of information
- facilitating the development of higher-order thinking skills by modelling 'what-if' processes. For example, 'if we double the price of our most popular school shop item, how much would this increase our overall profit for the school shop?'
- enabling the child to see data in a visual format, thereby facilitating their understanding
- providing a means for the child to discuss and record the processes and results of his or her work
- enabling the child to keep records of his or her work or that of groups or sports teams.

Spreadsheet software: teacher uses

Teachers can use spreadsheet software to

- create and maintain records of children's scores, for example, to perform calculations such as computing average marks or comparing marks with those of other classes and other years
- prepare templates with grid layouts to speed and simplify worksheet preparation
- prepare class timetables
- adapt timetables for individual children, for example children attending learning support classes and special needs
- create a spreadsheet to collate a record of the costs of classroom materials, and other resources
- maintain records of children's books and other classroom items.

Database software

Database software can be used to store, manipulate and retrieve data. A database is an electronic version of a filing card system, and because the data is stored electronically it facilitates tasks that would be difficult and more time-consuming if performed manually. Databases are capable of storing data in the form of text, sound and graphics. Before introducing children to electronic databases, teachers can support children in using and creating paper-based collections of information, e.g., a phone book, product catalogue, a library catalogue, a dictionary, and so forth. At primary school level, children's experience of databases may be through the use of spreadsheet software, however, junior database programs are available, for example, Junior ViewPoint.

Database software: benefits for children

Database software can support children's learning in the primary school curriculum by

- promoting the use of questioning and analytical skills as the child collects and organizes information
- facilitating the child's ability to organise and analyse groups of information or data
- enabling the child to analyse a single domain of study (e.g., animal types) using complex queries
- allowing the child to search the database for information in several fields
- supporting the child's understanding of information in a new way using visual representations of data
- helping the child to make the transition from concrete to abstract understanding as they move from graphing with physical objects to creating two-dimensional displays of information.

Database software: teacher uses

Database software provides support for teachers in maintaining records of curriculum content for teaching and learning, and also children's records. Teachers can also use database software to

- plan schemes of work
- create and maintain lists of contact information for children and their parents and guardians
- store information and records of childrens' work and class records
- keep records of class specific teaching materials and resources and their location
- keep records of school and/or class library books.

Programming software

Programming software refers to the range of software that enables children to execute commands using specific programming language. One of the programming languages most commonly used in schools is Logo. There are many versions of Logo available, including MSW Logo which is freeware downloadable from the web. The latest development of Logo language is called Microworlds Pro, Logo Computer Systems INC. (LCSI) See www.microworlds.com.

Logo Software

Logo programming language was designed as a tool for learning. Logo is rooted in constructivist educational philosophy, which also informs the Primary School Curriculum. Logo is accessible to younger children and yet can be highly challenging for experienced users. Logo programming activities can include mathematics, language, music, telecommunications, science and robotics.

The most well known element of Logo – turtle graphics allows children to experiment with mathematical activities. Later developments included:

- the development of Logo Writer, with a word processing facility
- LEGO Logo, which uses Logo in conjunction with motors, lights and sensors in machines built out of LEGO bricks and other elements.

Logo can be used with or without a programmable floor turtle. The robot can be moved about on the floor by typing commands at the computer. For example, the command 'forward 100' tells the turtle to move forward in a straight line '100 steps', while 'right 90' tells it to rotate 90 degrees clockwise. Logo also has a built-in writing facility that allows it to draw the shape if it moves on a sheet of paper.

A common starting activity is to command the turtle to describe a square. The concept of a square can be approached through a child performing a series of movements following directions from peers that would lead him or her to walk the sides of a square on the classroom floor or in the playground. This concrete experience can then be replicated on screen by directing a similar turtle.

Logo therefore provides a learning activity that is at an intermediate stage between concrete experience and abstraction. At the simplest level, children must distinguish between the turtle's right and left and their own right and left. Children are engaged at a higher level in a mathematical activity that is more sophisticated. In this way, children can experiment with mathematical concepts in a semi-concrete way using Logo, and their actions are visible to them as they program the turtle on the computer screen.

Logo enables children to develop mathematical concepts and develop specific problem-solving skills in mathematics in an enjoyable and non-threatening way.

The following exemplar is a synopsis of a ten-lesson introduction to Logo turtle graphics, where the teacher introduces the children to Logo as a cross-curricular approach to learning about shapes and angles. In this example, the children worked with one computer in the class, which involved timetabling and planning. Children worked in groups and were timetabled for approximately ten minute sessions on the computer.

Exemplar Thirteen

A ten lesson programme using Logo to develop concepts of lines, angles and shape

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------|-------------------|--|
| Mathematics | Shape and space | 2-d shapes, 3-D shapes, lines and angles |
| Visual Arts | Drawing | Making drawings |
| SPHE | Myself and others | Relating to others |

Approaches and methodologies

- Talk and discussion, observing and recording, applying and problem-solving
- Exploring and investigating, estimation and prediction

Level

Third and fourth, also suitable for fifth and sixth

Objectives

The child should be enabled to

- develop an awareness of line, shape, form and space
- recognise an angle in terms of rotation
- solve problems involving lines and angles
- combine and make patterns with 2-d shapes
- represent mathematical ideas in different modes
- make hypotheses and carry out experiments to test them
- use appropriate manipulatives to carry out mathematical procedures.

use LOGO to create programs and procedures that will successfully execute to make the required shape

ICT resources

- MSW Logo (Freeware, downloadable from the web)
- computer/s
- printer

Other resources

Pencils and paper

Preparatory activities

- Work with the children on developing their understanding of line, shape, angles, etc using concrete materials.
- The teacher will need a Logo manual or some sample lessons.
- The teacher could make activity sheets containing Logo directions and encourage pupils to predict the shape that will be drawn before trying it out with a floor or a screen turtle.
- Create a help sheet showing the common commands which the children can refer to. e.g.

| | | | |
|---------|----|------|----|
| Forward | fd | Back | bk |
| Right | rt | Left | lt |

More information on Logo can be found at the Logo Foundation site:

<http://el.media.mit.edu/Logo-foundation/index.html>

Methodology

1. The teacher discusses computer programmes and how programmes are created. Introduce angles and right angles. Children walk right angles to make squares on the floor.
2. Children devise a formula for a square based on their 'walks'. *[fd 100 rt 90 fd 100 rt 90 fd 100 rt 90 fd 100 rt 90]* Explain the need to change the children's 8 steps to 100 in the formula. Discuss how to go left and the need to increase the number of steps.
3. Discuss basic commands e.g.– *fd , bk , rt , lt , cs , st , ht*. Examine the properties of a square, with the children. The teacher writes the formula for square, as dictated by the class, on the whiteboard. Introduce the repeat command. Repeat *4[fd 100 rt 90]*. Emphasise the need for correct syntax.
4. Discuss properties of squares. Introduce procedure "to square". *"To square' [fd 100 rt 90] end*. Each child then defines and makes a square of side 100.
5. Discuss the limitations of defining a square with fixed sides. Discuss with the children how to make squares of various sides. Introduce variables (not by name).
To square: sides [fd :sides rt 90] end
Each child then draws Square 20 Square 100.

6. Introduce the triangle, talk about the angles in a triangle. The children use paper to tear off the angles in a variety of triangles. Children will observe that when reassembled they make a straight angle. (a half circle - 180°). Discuss the properties of an equilateral triangle with the children. Children look at the outside angles and mimic the turtle's movements. Children will notice that in order for the turtle to make a 60° angle inside, he has to turn 120° .
7. Each child, makes a triangle *rt 30 (to turn the turtle)*
Repeat 3 [fd 100 rt 120].
8. The children attempt to define procedure for a triangle.
9. Introduce the following procedure to the class:
"square rt 10 square". Ask the children to predict the outcome. Children may predict that it will make two squares side by side. The teacher shows it visually using two cut-out cards at an angle of about 10° . The children may observe that a continuation of this pattern would make a circle. Elicit the number of 10° in a circle. Try several repeats, e.g. 30 repeats are too few, as the pattern remains unfinished. Children will discover by estimating and trialling, that it would take 36 repeats.
Each child takes turns to make the pattern: *36 [square rt 10 square]*
10. The children 'walk' a circle and discuss their findings. Children will come up with *Repeat 30 [fd 30 rt 1]* to make a circular type shape. Discussion will elicit the need for small steps and small turns. Following discussion on the number of repeats, decide on 360 as there are 360 degrees in a circle. This leads to the procedure *Repeat 360 [fd 1 rt 1]*. Each child can then attempt to create a circle.

Extension activities

Children could

- use the Roamer – a robot that can be used in a wide variety of ways, which captures pupils' interest and imagination when they are presented with hands on, problem-solving activities.
- create more complex designs in senior classes.

Control technology

Control technology has many benefits in supporting the approaches and methodologies of the Primary School Curriculum. It enables pupils to develop problem-solving strategies and skills at their own pace. Pupils use concrete strategies to externalise their thinking, which allows them to reflect on what they are doing and how they are doing it.

Control technology allows children to explore a range of features in mechanical design such as power, speed, gearing, friction, sensing, and feedback. This technology can be used to build and programme models to perform various tasks. The children plan what they want the model to do, and then write computer programs accordingly.

The exemplar that follows shows how children can learn both technological concepts and skills, within the context of a creative project in Language. The project was carried out over an extended period - the children in this example had no prior experience of Lego Mindstorms. Control technology is not limited to the uses described in this exemplar. Additional information and examples of the versatility of use may be seen at <http://empoweringminds.mle.ie>



Exemplar Fourteen

Using Control Technology to design and make a scene from a story

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------|--|--|
| Language: English | Emotional and imaginative development through language | Oral: developing emotional and imaginative life through writing and oral language Reading: responding to text |
| Mathematics | Shape and space | 2-D shapes, 3-D shapes, lines and angles |
| Visual Arts | Construction | Making constructions |

Approaches and methodologies

Talk and discussion, problem-solving.
Observing and recording, communicating and expressing.
Exploring and investigating.

Level

Second and Third class in this project.
Lego Mindstorms has been successfully used from third to sixth classes.

Objectives

- The child should be enabled to
- discuss favourite moments, important events and exciting characters in a story
 - extend his or her response to increasingly challenging reading material
learn about Oscar Wilde's story, 'The Selfish Giant' by reading the story aloud in class and writing poems and stories based on the tale
 - explore and experiment with the properties and characteristics of materials in making structures
design a model garden which includes various characters from the story and elements from his or her own life, using Lego Mindstorms and the RCX brick
 - solve problems involving lines and angles
develop his or her ideas of design, control, sensing, and programming through project-based learning
 - develop an awareness of line, shape, form and space.

ICT resources

- computer/s
- programming software, e.g. Lego Mindstorms – a robotic construction kit launched by the LEGO Group
- the “RCX Brick,” is a programmable LEGO brick that contains a tiny computer, batteries, a display screen, and circuitry to operate motors and connect to sensors.

Other resources

- a large collection of LEGO building blocks, decorative pieces, and newer pieces like gears, beams, axles, and other mechanical components
- *The Selfish Giant* text
- pencil and paper to diagram draft model plans

Preparatory activities

- To develop children’s spatial awareness when working with floor and screen robots, provide resources to help them to visualise ‘how many’ or ‘how far.’
- Cut out floor robot outlines to lay on the floor and use them to work out how many units the robot needs to travel to reach a specified place. Coloured ‘clocks’ showing 30°, 60°, 90°, 120°, 150° and 180°, left and right, can help pupils to develop an awareness of angles.

Methodology

1. Having visited Merrion Square in Dublin to see Wilde’s statue, children read the story ‘The Selfish Giant’ aloud in class, and write poems and short stories based on the tale.
2. The teacher demonstrates functions of the programming software.
3. In groups, children begin their designs for creating a garden which contains characters from the story, as well as elements of their own lives.
4. Children use Lego Mindstorms and the RCX brick to design a garden and various characters from the story. To construct the garden, arrange four approximately 1 metre square pieces of pressboard in a square. On this base, the children re-create the central scene and characters from the story – a large garden walled off from the rest of the city, a tree in the garden, the giant, and the little boy.
5. The children may also wish to represent elements from their own lives in the scene.
 - Outside the walls of the garden they can include a road filled with traffic, and modern buildings. They

intersperse little security cameras throughout. They put a large sign on the walls protecting the garden reading, "Trespassers will be prosecuted."

- The children use the RCX brick to program patterns of movement and beep sequences into several of the cars out-side the garden walls
 - The giant is the biggest single LEGO construction, and it includes an RCX brick programmed to make its eyes flash and its arms rotate back and forth.
 - The children also build swings and merry-go-rounds in the playground which are activated by an RCX.
6. In groups, children share their projects with the class, and discuss their use of functions of the software to achieve their final product.

Extension activities

Children could

- design and make floor mats representing the school, the local area or a local park
- create similar projects based on scenes from a class novel, events and elements in history, legends and sagas.

The teacher could

- make stepping stones for pupils to use with a floor turtle or Roamer – these can be used to create a number line, or to develop letter recognition and alphabetical order.



Programming software: benefits for children

The use of programming software in the primary school curriculum can benefit children by

- developing children's oral language as they talk and discuss the possible outcomes of their programmes
- developing the confidence of reluctant readers who can manage the abbreviated language in LOGO
- giving children a sense of ownership of their work, as they create new projects or programmes
- supporting children's learning at a variety of ability levels
- enabling children to progress at their own rate
- teaching children that mistakes can be used as opportunities for further learning
- supporting the visual learner, who can see the results of his or her procedures enacted in a concrete way
- motivating the child through active engagement associated with a fun activity
- supporting an increase in children's understanding as they practise listening to and following instructions until they are capable of following quite complex sequences
- developing children's abilities in formulating and providing instructions for others so that they can be easily understood
- developing social skills through interaction and collaboration with other children, and engaging in talk and discussion on the problem to be solved
- developing the child's problem-solving strategies - prompting the child to engage in collaborative discussions, pondering questions, predicting results and seeing immediately the effects of his or her decisions.

Programming software: teacher uses

Teachers can use programming software to

- engage the children in cross-curricular activities
- enhance children's mathematical thinking
- integrate with designing and making and pattern work in visual arts
- provide a context, setting and material for oral language development
- support a whole school approach which can be used progressively at different levels with different age groups
- support group work and classroom organisation
- cater for multiple intelligences
- support a varied approach to differentiating for children's learning needs, for example, to support the kinaesthetic learner.

Content-rich software

For convenience, content-rich software refers to reinforcement software, simulation software and reference software. Though content-rich software is traditionally available on CD-ROM, many companies now provide versions of their software on the Internet, (software on-line) including support material and updates.

Reinforcement software

Reinforcement software can support learning at different class and ability levels and in a variety of subjects. At one level, it offers children opportunities to work on specific tasks, while at another level it can form an *integrated learning system*, which is designed to teach, assess and record the activities of children while they are engaged with the software. Many content-specific software packages provide most or all of the following instructional tools for child-use:

- tutorials
- simulations
- graphing tools
- practice problems or workouts
- assessments
- performance feedback.

One of the benefits of content-specific software is the opportunity it provides the learner to engage or interact with the material. However, curriculum software should contain meaningful interactivity which has an educational purpose and allows children to engage with content in ways which promote learning. Clicking endlessly is not regarded as meaningful interactivity, rather the child should be set tasks, posed problems, asked questions etc. within the context of the application. Reinforcement software typically offers a management system, whereby the teacher has the option to select the concepts and skills that the child can access in a given content area.

Reinforcement software can be used to support learning in every subject area:—science, history, geography, etc. and has developed wide usage in the areas of language and mathematics.

In the mathematics curriculum, reinforcement software can support children in mathematical activities such as

- classifying and matching
- extending patterns and sequencing
- counting and analysing of numbers
- understanding place value
- using the four operations (+, −, ×, ÷)
- manipulating fractions and decimals
- recognising and interpreting data

- performing operations involving time, weight, money, capacity, length and area
- recognising basic geometric shapes.

Some examples include:

| Title | Publisher |
|-------------------------|---------------------------|
| Millie's Maths House | Edmark/Riverdeep |
| Breakaway Maths | SEMERC, Granada Learning |
| Number Shark | White Space |
| Intellimathics | Inclusive Technology Ltd. |
| Crystal Rainforest 2000 | Sherston |

In the language curriculum, reinforcement software provides children with opportunities for

- recognising patterns
- developing an awareness of left to right and top to bottom orientation
- colour-matching
- letter recognition
- auditory discrimination, visual discrimination
- phonological skills, exploring sound-letter relationships, rhyme, auditory memory
- word recognition
- spelling practice through structured spelling games
- building basic sight vocabulary
- sequencing tasks
- cloze procedures
- learning and responding to nursery rhymes, poems and songs
- reading comprehension.



Interactive books

Interactive books are one example of reinforcement software for English. Interactive books can be read by a child, by a group of children, or by the whole class on a computer or a large screen. Each page has a number of interactive buttons, and the child can activate the book by clicking on the buttons on the computer screen. Some characters in the books may be animated and may provide a verbal response when prompted by the child (using the mouse). Such stimuli can provide a context for prediction, questioning and language development.

Interactive books can enable children to participate in collaborative group discussion about the meaning of the text. The highlighting of text supports children's word identification. Children may revisit parts of the book in order to become more familiar with the text. Through the use of the interactive visual stimuli, children can be encouraged to discuss the scene that is presented on screen.

Some examples of interactive books include:

| Title | Publisher |
|--------------------------------|---------------------------------|
| Wellington Square | SEMERC |
| The Oxford Reading Tree Series | Sherston Software Ltd. |
| Living Book Series | Tag Learning Ltd., Broderbund |
| UKanDu Little Books software | Don Johnston Special Needs Ltd. |

Reinforcement software: benefits for children

The use of reinforcement software in the Primary School Curriculum can benefit children by

- reinforcing concepts and knowledge
- providing opportunities to practice and repeat concepts previously learned
- supporting and motivating the child by providing immediate feedback and reinforcement
- adapting to suit the needs of the auditory learner and the visual learner
- helping to develop the child's comprehension skills, and strengthening word recognition abilities, through the use of interactive books.

Reinforcement software: teacher uses

Teachers can use reinforcement software to

- devise supportive lessons for pupils with specific learning needs.
- allow children who are familiar with basic concepts to pursue enrichment activities
- help in identifying the areas where a child needs support, as they can evaluate the child's progress, through the progress records
- develop extension materials based on the activities in the programme.

Simulation software

Simulation software, often referred to as adventure software or game-based learning, developed from the powerful simulation type software often used in business and in training to tackle complex issues in a safe environment.

Its application in education can be successful when applied in problem-solving situations, or in adventure type scenarios. The teacher should be aware of the purpose and target activity of the software, as there are many applications which have little or no educational value, and are more suitable for children's leisure use. Software in the form of interactive adventure games can be motivating and absorbing for the learner and can provide an immersion learning environment.

Exploratory type software provides children with simulations, micro-worlds and adventure games that replicate elements of the real world. Simulation software has many applications in activities such as science – exploring scientific concepts such as forces, in history – where the learner can go back in time, in geography – where the learner can simulate travelling and exploring in other lands.

Simulations can capture a child's imagination. They are designed to make children ask questions and try out different scenarios and view the effect of any changes they make. Children are engaged in both the process and the outcome of their questioning, interpretation and analysis of information. Exercises can be achieved on a variety of levels. Children can draw on their own experiences to guide their actions and decisions, both current and past, so integrating what they may already know with what they are learning. Some examples of widely used adventure and simulation type software include:

| Title | Publisher |
|---|-------------------------------|
| The Logical Journey of the Zoombinis | TAG |
| Where in the World is Carmen Sandiego Carmen Sandiego Junior Detective | Broderbund Software/Riverdeep |

Simulation software: benefits for children

The use of simulation software in the primary school curriculum can benefit children by

- making learning fun
- developing the child's powers of concentration and ability to think clearly
- providing situations to develop the child's language, comprehension and discussion skills, when they explore and investigate problems, while working with peers
- presenting situations to develop the child's cooperation skills as they learn to consult and resolve problems
- posing problems to develop the child's spatial and directional sense, e.g. manipulate areas in the programme environment
- providing opportunities for the child to practice sorting and classifying information

- allowing the child to take risks, take on different roles and behaviours in a non-threatening environment
- providing the child with the opportunity to experience decision-making and the simulated consequences
- engaging the child in their own learning, when they investigate and discover for themselves or under the guidance of the teacher
- providing a facility for the child to monitor the results of their actions
- giving the child a sense that they are in control of their own learning
- promoting active learning as the child creates and re-creates an environment, as well as interacting with it
- providing opportunities to develop the child's problem-solving skills
- extending the child's ability to think critically, forming reasons for his or her actions as he or she works closely with other children
- bringing the child's abstract concepts to a more real understanding.

Simulation software: teacher uses

Teachers can use simulation and adventure type software to

- make learning more meaningful and enjoyable for the children
- create follow on tasks for classroom work , e.g. written tasks, problem-solving, research, which the children are engaged with
- integrate across curricular areas
- present material to the whole class using a data projector
- develop a particular theme, based on the subject/s of the simulation
- evaluate childrens' progress in the activities and problem-solving tasks. (through the records)

Reference software

Reference software can provide children with access to a range of information resources to support project work and learning in a variety of curriculum areas. The principal forms of reference software are

- multimedia encyclopaedias, atlases
- subject specific informational resources
- the Internet. (The Internet is treated separately in chapter 4.)

Reference software can be used to support all curricular areas. For example, there are many software packages that aid pupils in their investigation into music and composition. Children can also use CD Roms or the Internet to research musical instruments, composers, and a wide variety of types of music from different cultures.

In order to use reference software effectively, children need to acquire information management skills. These skills in information seeking and handling should be developed gradually in response to the child's needs as he or she progresses through the school. At the same time, it is important that the child learns to collate, summarise, and present the information that is accessed. Much of the value of using reference software will be lost if the child just engages in cutting and pasting information retrieved from the software.

Children should be enabled to

- decide what information is needed
- select appropriate resources
- search for the information
- retrieve the information
- record appropriate information
- analyse the information
- formulate and present information
- review and evaluate the task.

A further discussion on information handling skills is available in Chapter Four in relation to searching for and evaluating information from the Internet.



The following exemplar describes children's use of reference software to learn about other countries.

Exemplar Fifteen

Learning about countries of the world using reference software

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|---|--|
| SESE: Geography | Human environments Natural environments | People and other lands Physical features of Europe and the world |
| Approaches and methodologies | Observing, questioning, recording and communicating, researching, using pictures, maps and models. | |
| Level | Third, fourth, fifth and sixth classes | |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> • study some aspects of the environments and lives of people in one location in Europe and one location in another part of the world • learn about a small number of the major natural features of Europe • become familiar with the names and approximate location of a small number of major world physical features • carry out simple investigations and collect information from a variety of sources • sort, group and or classify data on people, events, and natural phenomena using a range of appropriate criteria • record and present findings using a variety of methods, including oral, written, and using ICT. | |
| ICT resources | <ul style="list-style-type: none"> • reference software (e.g., Encarta, or "Where in the World is Carmen Sandiego?") • teacher-designed materials (e.g., fact file activity sheet, group progress record) • multimedia presentation software • the Internet • scanner, scanning software | |

Other resources

Encyclopaedia, maps, globes, Pencils and paper,

Preparatory activities

Teacher familiarisation with the software and availability of other research resources.

Methodology

1. The class is divided into groups of three. Each group researches a particular country. Groups are given a fact file activity sheet. These contain questions and tasks, which the children attempt, e.g.,
 - name some important industries in the country
 - draw the flag
 - copy and paste a picture related to the country on to the activity sheet
 - identify the 3 highest mountains.
2. The groups research their chosen country and attempt to collect information needed for the various tasks. They record their answers and compile their work in a folder. Their work may include some of the following:
 - identify sources of suitable information,
 - access suitable information in a CD-ROM
 - search the Internet and navigate suitable portal websites, e.g., www.scoilnet.ie
 - download material from the Internet
 - copy graphics where appropriate
 - use e-mail to collect information or to collaborate with children in other schools
3. The groups may present their findings to the class orally, using presentation software, or in written and diagram format.

Extension activities

Children could

- design a poster to promote a particular country, including, for example, six different pieces of information about the country
- create a multimedia presentation on a particular country and present to other classes using various headings such as
 - name and origin of name
 - physical features
 - climate
 - history
 - significant sites and buildings
 - culture

- publish the project on a school website
- collaborate with schools in the countries under study (using video-conferencing equipment, or e-mail) to extend their understanding of other cultures.

Where in the World?

Country: _____

Continent: _____

Capital City: _____

Language(s): _____

Insert a map of the country here

Industries: _____

Exports: _____

Flag:

3 Interesting Facts: _____

2 Famous Landmarks: _____

Insert a picture related to the country here

Cooperative Learning Group: _____

Sixth class, Sacred Heart School, Portlaoise, Co. Laois

Reference software: benefits for children

The use of reference software in the primary school curriculum can benefit children by

- providing access to a vast amount of information
- encouraging children to actively engage in learning (in order to retrieve, analyse, and select information)
- vividly presenting events or processes
- maintaining children's interest through the use of visually stimulating multimedia resources
- supporting the child's understanding of the organisation of information in library and reference material
- facilitating thematic exploration through the use of hypertext links (the highlighted text links users to other related materials)
- fostering children's reading and comprehension skills such as scanning for meaning, prioritising and summarising.

Reference software: teacher uses

Reference software provides support for teachers in planning lessons, developing activities, and maintaining records.

Additionally teachers can use reference software to

- set research tasks for children to study in groups or individually
- support children's use of paper encyclopaedia
- introduce children to search tools and terminology
- teach library and research skills such as using an index, using a table of contents, searching by key words, etc.
- teach children about categories and methods of organising information.

Assistive technology and access to software

Assistive technology software includes both standard and specialised programs that give children access to a range of computer and ICT resources. Many assistive technology software packages will work on a standard computer without special adaptations. However, some children will need special peripherals or add-on devices to help them access both ICT software and assistive technology software. These peripherals include

- alternative keyboards
- keyguards
- alternatives to the mouse, for example rollerball, trackerball, joystick
- concept keyboards
- touch screens
- switches.

Peripherals should be chosen to meet the holistic needs of the pupil. Children may need to try out a range of devices in situ before a final choice is made, and will also need time to train on new devices. Needs and options will change as both children and technology progress. Some of the peripherals will allow children access to the full range of standard educational software options used by their peers. Devices, such as switches will generally give access to specialised software, but expert advice and support will be necessary.

Some children may need a customised system comprising of a combination of computer peripherals and software to address their particular needs. For example, a visually impaired pupil may use a computer and a scanner equipped with optical scanner recognition software to scan text. This allows children to store, edit and use the material on the computer and output information via print, speech, or Braille as required. Closed circuit television (CCTV) is another example of a specialised assistive technology solution.

With many assistive technology devices children can use the same standard ICT software as their peers in order to support their learning. As with standard ICT software programs, they can be content-free or content-rich.

Assistive technology: content-free software

Content-free assistive technology software can take the form of complete programs, for example a customised word processor, or applications that can be used with standard programs, for example text magnification. Many children may need support in order to access the communication and writing facilities of ICT. Options include

- word prediction
- grammar prediction
- word banks
- speech output
- Braille output or input
- screen magnification
- a screen reader.

These options can be used within or alongside writing programs.

In addition to accessibility options and settings within the operating system of the computer, Windows can be altered to assist children. The control panel settings can be adjusted in a number of ways, for example to prevent repeat keystrokes, to slow mouse movements or to enlarge the pointer on screen. Other options include the use of foreground or background colour contrasts, the adjusting of font type and size, or the customising of the desktop and screen.

Another useful type of content-free software allows children to access easily stored pictures, words and phrases for use in communication and writing. The material can be used by teachers to support the development of children's concepts and skills, and to facilitate access to curricular topics. These programs allow a range of access options and can be of use both to children with learning disabilities and to children who need assistive technology. In addition, software which produces an on-screen keyboard is useful for those children who cannot use a standard keyboard.

For children who are unable to access a computer physically, voice recognition programs that are compatible with general software present further options. At present, however, such programs have not been refined to a sufficient extent to be considered suitable for multi-users in primary schools.

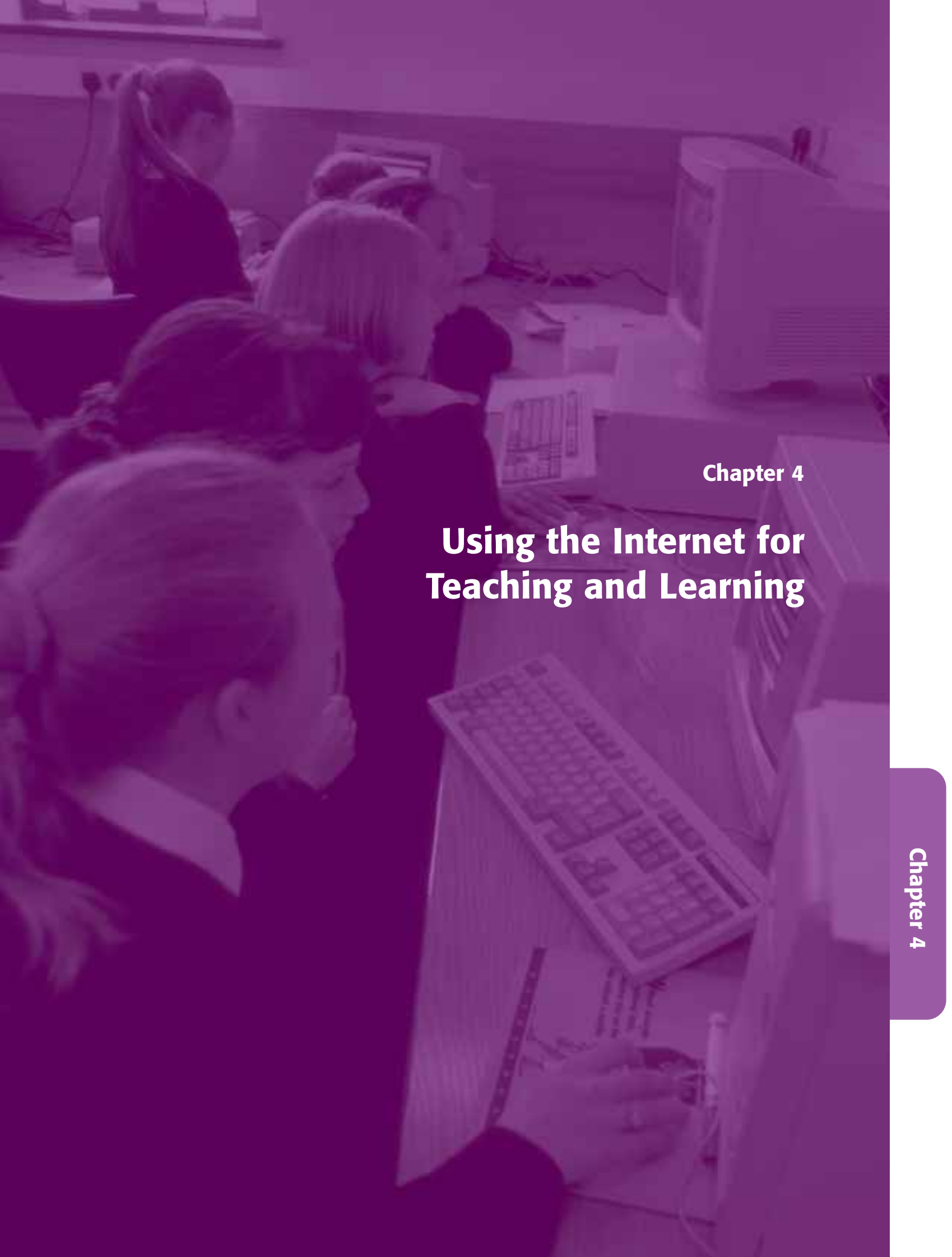
Assistive technology: content-rich software

There are some content-rich software programs that are designed to facilitate switch access. Most of these are suitable for younger children. These include programs which afford practice in and reinforcement of basic skills and concepts. The number of such programs available that can aid the development of literacy and numeracy, provide reference sources, or facilitate cross-curricular activities is growing. These programs, where their effectiveness is proven, can be used by all children in the classroom, as most switch programs can be used with the mouse or the standard keyboard.

Using software with a digital projector or large-screen television

Software can be used in the classroom for direct instruction. At a basic level, the computer can be used in conjunction with a digital projector or large-screen television to present materials in different subject areas. For example, a teacher might use this method to present a topic in history or science to a senior class or to explore an interactive book with an infant class. In a more sophisticated way, it is possible for the teacher to combine text, graphics, sound and video in a multimedia presentation.

Software can also be used to demonstrate concepts in class. For example, a concept in geometry can be explored with great flexibility using software such as LOGO. Samples of writing could also be presented, and the children, interacting with both the teacher and their peers, could contribute to a discussion on how the different pieces of writing might be improved.



Chapter 4

Using the Internet for Teaching and Learning

Using the Internet for teaching and learning

Internet use has expanded greatly and is now an accepted part of life for many people. The Internet and World Wide Web (WWW) is also a powerful resource for teaching and learning, opening up a remarkable range of resources.

The Internet has three identifiable uses for schools:

- an information resource: the WWW can be compared to a vast library which can be accessed by teachers and children using information retrieval skills. It can provide resources including curriculum-related content, planning ideas for teachers, and information on education and schooling issues. Additionally, a wide range of material and software can be downloaded from the Internet.
- to facilitate communication both locally and globally, between schools, teachers and children through e-mail, electronic conferencing and video conferencing
- to provide a facility for publishing school work on the WWW, stimulating communication between schools, children, parents and others.

An information resource

'Information retrieval skills are central to learning in every Curriculum area'

Primary School Curriculum, English, T.G., p. 62.

The Worldwide Web (WWW) is invaluable as an information resource for teachers and children both at school and at home. The teacher can use the WorldWide Web to support children's learning, adding value by creating learning environments and by shaping web-based activities.

Additionally, using the Internet as a learning resource supports the constructivist approach to learning espoused in the Primary Curriculum, which acknowledges that children do not acquire concepts from fragmented knowledge, but from weaving together relationships between topics into a complex and synthetic whole. Children have to manage, evaluate, and integrate the information that they find from a range of sources. Many resource sites also allow the learner to interact with the materials, stimulating collaborative learning across geographic boundaries.

The WWW can support children in making sense of information when it is used as a reference site, as a resource for projects, to engage in activities, and for lessons. The Internet can also add a virtual dimension to the child's learning, breaking down barriers of remoteness and inaccessibility when the real or actual experience is unavailable.

Evaluating Internet resources

Because of the absence of standards for publishing information on the WWW, it is important that primary school teachers and children develop the skills to evaluate information available on the WWW. Guided by the teacher, children will gradually develop skills in evaluation, when searching for and finding information from the WWW and from other resources. Additional considerations in evaluating websites relate to the issues of authority and authenticity.

Criteria and questions which teachers and children may use to evaluate websites include:

| | |
|------------------------|--|
| Source: | Is the website hosted by a reputable source? Is there a header or footer showing to whom it is affiliated? |
| Content: | Does the website present error free, accurate information? How in-depth is the information? Is the language level suitable/ appropriate for children? |
| Currency: | What is the website publication date? When was the information last updated? Is it still current/relevant? Are any of the links out of date or broken? |
| Authorship: | Who is responsible for the site? Has the author provided his/her contact information (e-mail, phone or mail)? |
| Bias/Intention: | Is the information presented unbiased? Can you distinguish facts from opinion? |
| Site design: | Is the site easy to navigate? Are links clearly labelled? Do they serve a purpose? Does the site contain non-functioning links? Are graphics helpful? |
| Access: | Does the website provide access to information for all children? Is the information presented in multiple formats (text, audio, graphic)? Are text alternatives available for pictures and graphics? |

Additional resources and assistance in evaluating suitable educational web resources is available through *Scoilnet*. *ScoilNet* (www.scoilnet.ie) is the official educational portal for schools in Ireland and is hosted by the Department of Education and Science. It contains ICT teaching and learning resources which may be used to support particular curriculum areas, as well as useful advice on ICT issues and links to other sites.

Accessing Internet Information

Many schools connect to the Internet via a dial-up connection, on a PSTN (normal) telephone line. In such cases, the teacher may not be able to rely on predictable access to a site for a particular lesson. One solution is to copy the site to a CD-ROM, or to the local hard drive in advance of the lesson/s.

Additionally, and where there are few internet-connected computers in the school or classroom, the teacher can help to maximise access by

- bookmarking specific websites
- downloading images, reference material and resources from websites
- downloading entire websites using web-whacking software
- projecting the screen from the connected computer to a larger screen
- printing out valuable resources for children to view
- organizing children into groups with the same research needs.

Searching for educational resources on the web

The concept of 'digital literacy or ICT literacy' includes a whole range of information handling skills, including the ability to access, manage, integrate, evaluate and create information. The first component, the ability to access information, (knowing about and knowing how to collect or retrieve information) lays the foundation for the child's ability to use that information.

Searching for information on the Internet requires a range of information-handling skills, an understanding of how the Internet works, and the capacity to make sound judgements regarding the relevance and reliability of the information retrieved. These skills are important aspects of digital literacy. Certain of these information-handling skills: using a table of contents, indexes, dictionaries, encyclopaedia, will be developed in classroom work across curricular areas. Finding and using information on the Internet requires a further refinement of these skills.

Typically, people search for information on the Internet using a search engine or a web directory.

There are numerous search engines available, each of which has particular advantages depending on the search needs. There are also specialized search engines for children, for example, *yahooligans*. www.yahooligans.com
NCTE provides advice and support on the use of search engines. www.ncte.ie

Teachers and children will be familiar with the experience of receiving thousands of results to the search term or key word entered in a search engine or a web directory. The ability to use a search engine to target the right answer is very much dependent on the quality of the question or search terms used. The ability to refine search terms, so that the search engine returns the required information is dependent on a range of navigational, information handling and analysis skills.

The child's ability to search for and evaluate information in this way will develop gradually, alongside the child's developing cognitive skills, questioning skills, and critical powers of evaluation. Teachers can support this development through providing guided searches, and exploring with the children how search engines work.

Children can be supported in developing information handling skills, through the use of a range of teacher prepared scaffolds for searching the Internet. Short activities using keywords or search terms, can help to refine children's discrimination.

For example, children in co-operative groups create a list of suitable search terms on paper. Working under the guidance of the teacher, and having entered the search terms, the teacher and groups compare the results of the search returns from the different search strings.

Talk and discussion ensues as to why some searches return more relevant results, for example

- the use of more refined terms
- the use of operators such as 'and'
- the use of precise rather than general terms.

Activities such as these will help to refine the child's understanding of how best to use search terms.

The following teacher-prepared resource guides can support children as they search for information online. Each activity can be used appropriately to use the child's time well by focusing his or her attention on using and evaluating information rather than looking for it. These web resources can promote problem-solving skills, research skills, critical thinking, co-operative learning and group work.

The supports are listed in increasing levels of complexity, depending on whether teachers and children are new or already fairly adept users of the web.

| RESOURCE | USE | BENEFITS IN TEACHING AND LEARNING |
|-----------------------|---|---|
| Favourites | <ul style="list-style-type: none"> to organise the results of searches to bookmark useful sites as they are found for later retrieval to gain ready access to frequently used sites. | <ul style="list-style-type: none"> creating folders for different subject categories and interests learning to organise information by categories maintaining categories for project research understanding file management. |
| Download media | <ul style="list-style-type: none"> to download (save) pictures and images to a folder for later retrieval to save individual web pages to a folder on the hard drive (multimedia scrapbook) for later retrieval. | <ul style="list-style-type: none"> storing frequently used information for research in projects collecting material for reading and working offline working with whole class to display on the digital projector (especially sites which provide useful images). |
| Topic hotlist | <ul style="list-style-type: none"> to focus on a particular subject or theme by using a prepared list to direct children's searches to the most useful sites for a particular theme. | <ul style="list-style-type: none"> exploring a subject or theme concentrating on the most useful sites when engaged in project work saving time, as the searching is limited directing search activities for inexperienced users. |
| Treasure hunt | <ul style="list-style-type: none"> to focus on solving a single problem, goal or question. to direct the learner to method of solving the task using sub-questions or clues which provide links that eventually lead the child to the solution. | <ul style="list-style-type: none"> building knowledge incrementally motivating the child with clues and mini tasks developing the child's own skills in solving problems in stages. |

- Subject sampler**
- to direct searching to a specific target by presenting a list of a range of websites on one subject
 - optimising children's searches by directing them to the specific sites on the target subject
 - aiding the child's understanding of how information is organised in categories

- Web Quest**
- to present complex problem-solving tasks
 - to present an enquiry oriented activity which has several parts (introduction, question/task, background, roles, process, reflection, conclusion)
 - to direct the child's use of web searches
 - to focus on the use of information to complete a task or solve a problem rather than on searching
 - to organise children's project based learning, either short or long term projects.
 - developing the child's understanding of the range of approaches that may exist in addressing a topic
 - developing the child's problem-solving strategies,
 - developing the child's independent learning strategies
 - using the child's time well, as it is a focused activity
 - motivating the learner through a range of challenging activities
 - supporting the child's learning at the levels of analysis, synthesis and evaluation
 - allowing the teacher to organise short or long term projects.
- See an example web quest on Ancient Egypt at <http://www.iwebquest.com/egypt/ancientegypt.htm>

Teachers can view examples and find suggestions for creating their own web quests at <http://webquest.sdsu.edu/>

The sample task sheet below suggests one layout structure for a treasure hunt on Ireland, suitable for middle and senior classes.

| SAMPLE TREASURE HUNT TASK SHEET | |
|---|--|
| Task/Question | Website |
| <p><i>Travel</i></p> <p>How many trains will leave Cork for Dublin in two days from now? At what times will they leave?</p> | <p>www.irishrail.ie</p> |
| <p><i>Irish weather</i></p> <p>Find a map of Ireland which shows the weather forecast two days from now.</p> | <p>www.meteireann.ie</p> |
| <p><i>Irish peatlands</i></p> <p>What percentage of the Republic of Ireland is covered by peatlands? Where are the peatlands located? (Clue: go to the section, Peatlands of Ireland)</p> | <p>www.bnm.ie</p> |
| <p><i>National Gallery</i></p> <p>Name a famous painting by Caravaggio that can be seen in the National Gallery (Clue: go to the section, Paintings).</p> | <p>www.nationalgallery.ie</p> |
| <p><i>President's residence</i></p> <p>When was Áras an Uachtaráin built?</p> | <p>http://www.gov.ie/aras/history.htm</p> |

Main question

What itinerary could you provide for tourists who wish to travel from Cork to Dublin two days from now, and visit each of the above three attractions? Your itinerary should specify appropriate clothing, and provide opening times and suggest approximate times to visit each of the above three locations, as well as introducing each of the locations using the information you have gathered.

The following exemplar describes how a teacher developed a resource for the structured use of the Internet to develop children's information handling skills.

This example links into a website created by the teacher. Teachers can also prepare topic lists and problem-solving quests for the children on a printout.

Exemplar Sixteen

A project on world buildings using a hotlist of Internet websites

| Curriculum Area/s | Strand/s | Strand unit/s |
|--------------------------------------|---|--|
| SESE: Geography | Human environments | People and other lands |
| Social Personal and Health Education | Myself and others Myself and the wider world | Relating to others Developing citizenship |
| Approaches and methodologies | Oral language - Talk and discussion, collaborative learning, problem-solving, questioning, predicting, analysing. | |
| Level | Middle and senior classes. | |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> • study some aspects of the environments of people in a location in another part of the world • develop reading comprehension, vocabulary and oral language skills • develop problem-solving skills • find and organise information on a given topic • develop communication skills, both socially and technologically facilitated • work collaboratively. | |
| ICT resources | <ul style="list-style-type: none"> • computer/many computers • Internet access, • digital projector or large screen television • word processing software (e.g., Microsoft Word) • scanner, scanning software and digital camera | |

Other resources

Pencils and paper, reference books

Preparatory activities

Teachers can prepare topic hotlists to suit the age group and activity concerned.

Whole group discussion and organisation of groups for each of the activities.

Methodology

1. During a whole-group discussion, the children are introduced to the project, groups are organised and the buildings to be researched are selected. Those on offer can be viewed at www.teachnet.ie/roleary/bldngs.htm
2. Each group accesses the web pages, which contain both the questions which must be answered on their chosen building, as well as the links to websites which provide information on the building. For example, work relating to the Taj Mahal is located at www.teachnet.ie/roleary/tajmahal.htm
3. Children, working in groups, locate the information and graphic resources they require. Specific pupil instructions can be viewed at www.teachnet.ie/roleary/children.htm. They are asked to tell the story of the building in their own words, and use a number of key questions to structure their composition, e.g., location of building, when it was built, why, and so on. This web page also includes links to tutorial pages, which show the pupil how to carry out specific tasks, for example, how to download and save an image from a web site.
4. Children draft, edit and redraft their work. The children ensure a balance between title, text and graphics on their completed work.

Extension activities

Children could

- draw a picture of the building, or make a model of the building, so that each child can speak about different features or aspects of the building
- pursue one of the suggestions for follow-up activities at www.teachnet.ie/roleary/followup.htm.
- be asked to devise a series of questions on the buildings. A number of links are provided to children's activity sheets, which can be adapted as appropriate.

The following resource guide showing a subject sampler, a tool that may be used by teachers in their planning when preparing projects for local research, or may be adapted by the teacher to suit the children's research needs

Exemplar Seventeen

A subject sampler on local history

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|---|---|
| SESE: History | Local studies | Local history (project): local studies |
| Approaches and methodologies | Researching, using reference material, exploring evidence, investigating original documents, talk and discussion, exploring the past | |
| Level | This exemplar can be adapted for use with all classes, but is more suitable for senior and middle classes. | |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> • develop information handling skills such as retrieving, managing, selecting and evaluating information • develop some skills in locating and selecting evidence • ask questions about pieces of evidence • examine and use critically a wide range of historical evidence. | |
| ICT resources | Computer, Internet access. Prepared teacher guide. | |
| Other resources | Local library, local people, children's parents, local historical societies and publications, local newspapers. | |
| Preparatory activities | <p>The teacher may search for information resources and download them to the computer hard drive, or prepare questions to direct the children's searching.</p> <p>The teacher organises groups for project work, and supports the division of activities and tasks.</p> | |

Methodology

Choose the topic of research, for example, family names in our locality, our locality in the past.

The teacher prepares a subject sampler for research on local history to guide the children's searches. These sites may be bookmarked in a favourites folder or provided on a printed page.

Searching for ancestors

- the National Archives and Census information
<http://www.nationalarchives.ie/genealogy.html>
- General Register Office
<http://www.groireland.ie/>
<http://www.irishroots.net/>
- looking at archive records
<http://www.nationalarchives.ie/birthsmarrdeaths.html>

Old photographs and prints:

- National Print Museum
<http://www.iol.ie/~npmuseum/>

Townlands database

<http://www.heritagedata.ie/en/Placenames/Townlands/>
<http://www.heritagedata.ie/ie/SeadchomharthaiNaisiunta/losladail/>

Libraries

- the Chester Beatty Library
<http://www.cbl.ie/>
- National Library of Ireland
http://www.nli.ie/fr_serv.htm
- Marsh's library, the oldest library in Ireland
<http://www.marshlibrary.ie/>
- county library websites. E.g.
<http://www.clarelibrary.ie/eolas/coclare/history/intro.htm>

Museums

- National Museum of Ireland
<http://www.museum.ie/index.asp>
- local museums E.g. Clare also available in Irish
<http://www.clarelibrary.ie/eolas/claremuseum/>
- the Hunt museum
<http://www.huntmuseum.com/>

Extension activities

The teacher could

- create subject samplers to guide children's research in music, visual arts, drama and other curriculum areas.

Children could

- use multimedia authoring and presentation software to complete and present their research projects, integrating images, text and sound, to create a book, a journal, or a CD ROM or video clip.



Software on the Internet

The Internet may be used, to access on-line activities, quizzes, and also to enable work on collaborative tasks. Software and other resources may be downloaded.

Many software companies now provide their software programs on the Internet. Additionally, online software resources and activities targeting particular curriculum areas may be found on the Internet, for example. <http://www.tryscience.org/>

A range of freeware and shareware software can be accessed from the Internet. The European Schoolnet Virtual School, maintains a database of freeware and shareware resources. http://www.eun.org/eun.org2/eun/en/index_vs.html

Tobar, an Internet web portal and collaborative repository 'as Gaeilge', offers support and materials developed by teachers. www.tobar.ie

A communication tool

The Internet provides schools with a new and revolutionary means of communication. Through the use of e-mail, it is now possible to send messages containing text, pictures and sound to anywhere in the world. It is also possible for children to videoconference with their peers in other schools in Ireland and elsewhere. The Internet also provides access to a range of online collaboration tools, including e-meetings and discussion boards, which teachers can use to collaborate with colleagues in other schools.

ScoilNet facilitates such communication, both nationally and globally, by enabling schools, teachers and children to find appropriate partners in Ireland, Europe or throughout the world. Partners can then plan, manage and publish projects using collaborative workspaces on *ScoilNet*. Educational portals such as *ScoilNet* offer schools an information and publishing resource.

Teachers can also find resources, news, practical examples and collaborative opportunities at eSchoolnet. This is an educational portal for schools in Europe, and is hosted by the European Schoolnet, which is an international partnership of more than 20 European Ministries of Education. eSchoolnet can be found at www.eschoolnet.org. and the European Schoolnet is available at www.eun.org.

There is also a range of eSchoolnet sites devoted to different initiatives. For example, http://eschola.eun.org/eun.org2/eun/index_eschola2003.cfm?lang=en is the designated website for eSchola, an eLearning awards project, where schools show innovative uses of ICT.

Individual project resources are also available, for example the Viking Network, which was set up as an international resource, based on electronic communications, and co-ordinated by a teacher in Norway. It included links to schools in all of the countries where traces of the Vikings have been found. The Viking Network website contains ideas for projects and activities that schools can collaborate on to stimulate the use of electronic communication in the teaching of history. Further information is available at: <http://viking.no/>

Collaborative projects can involve a range of learning activities. Children may engage in their own research and use e-mail to present their material and/or to collaborate with others.

Schools may collaborate in a number of ways including:

- e-mail collaboration projects
- a mascot (e.g., teddy) exchange project
- e-pals (electronic pen-pals) projects
- net-days projects
- using experts in residence
- school links for shared goals/purposes

E- Mail projects

E-mail projects can enhance and support the child's experience with the curriculum.

As e-mail is virtually instantaneous, it can open up possibilities that would be impossible to achieve conventionally. For example, children can collect data on the weather conditions at different points around the world at the same moment in time, and share the results.

An e-mail project can be set up between two or more partners – individuals, groups, classes or schools who are studying the same topic. Projects using email work best when there is an area of common interest between the partners in the project, for example, organising local sports matches, links between gaelscoileanna. The reasons for using e-mail for communication should be clear to all of those involved. Generally, reasons include linking with partners who are at a distance, and sharing work with other schools.

E-mail enables the partners to communicate without delay, to send attachments in different formats such as pictures, text, sound and multimedia.

The following exemplar illustrates how children in local schools located along the old railway line of the West Clare railway shared information about their town and locality, using e-mail.

Exemplar Eighteen

A co-operative project on the West Clare railway using e-mail

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------|---|---|
| Language: English | Confidence and competence in using language | Oral language, Writing: developing confidence and competence in writing and oral language |
| SESE: History | Local studies | Buildings, sites or ruins in my locality My locality through the ages |
| SESE: Geography | Human environments | People at work, transport and communications |
| SPHE: | Myself and the wider world | Media education |

Approaches and methodologies

Oral language activity, talk and discussion.
Developing a sense of place and space.
Examining evidence.

Level

All levels (the research is particularly relevant from third to sixth classes).

Objectives

The child should be enabled to

- learn about the methods of transport and transport routes both in the locality and in a contrasting part of Ireland
- actively explore some features of the local environment, become familiar with patterns of relationships between towns and their surrounding areas
- research an area of local history using a variety of tools
- record findings in writing and using word processing
- communicate with children in other school using e-mail.

ICT resources

Internet connection, word processing software (e.g., Microsoft Word), printer, scanner, scanning software and digital camera

Other resources

Pencils and paper, (for example journals) Local information

Preparation activities

The West Clare Railway was a local narrow gauge railway, which connected towns along the route from Ennis to Kilkee. It closed in 1961. The project was based on a train journey along the original route of the railway.

Methodology

1. An e-mail message was sent by a school in the town at one terminus of the line to the nearest school along the route. This contained information about the town and the locality.
2. The school that received the e-mail message added further data and information and included this in an e-mail sent to the next school on the route.
3. The e-mail message travelled the same route as the train stopping at the schools along the original route of the train.
4. Each school contributed to the e-mail message as it arrived in the school, adding to the information and forwarding it to the next school.
5. The project grew, and a fully interactive website was created, where callers can visit all of the schools or stations and access a rich body of information about life and topography along the route of the train. The website of the project is available at: <http://www.clare-education-centre.ie/projects/westclare-railway/index.html>

Extension activities

Children could

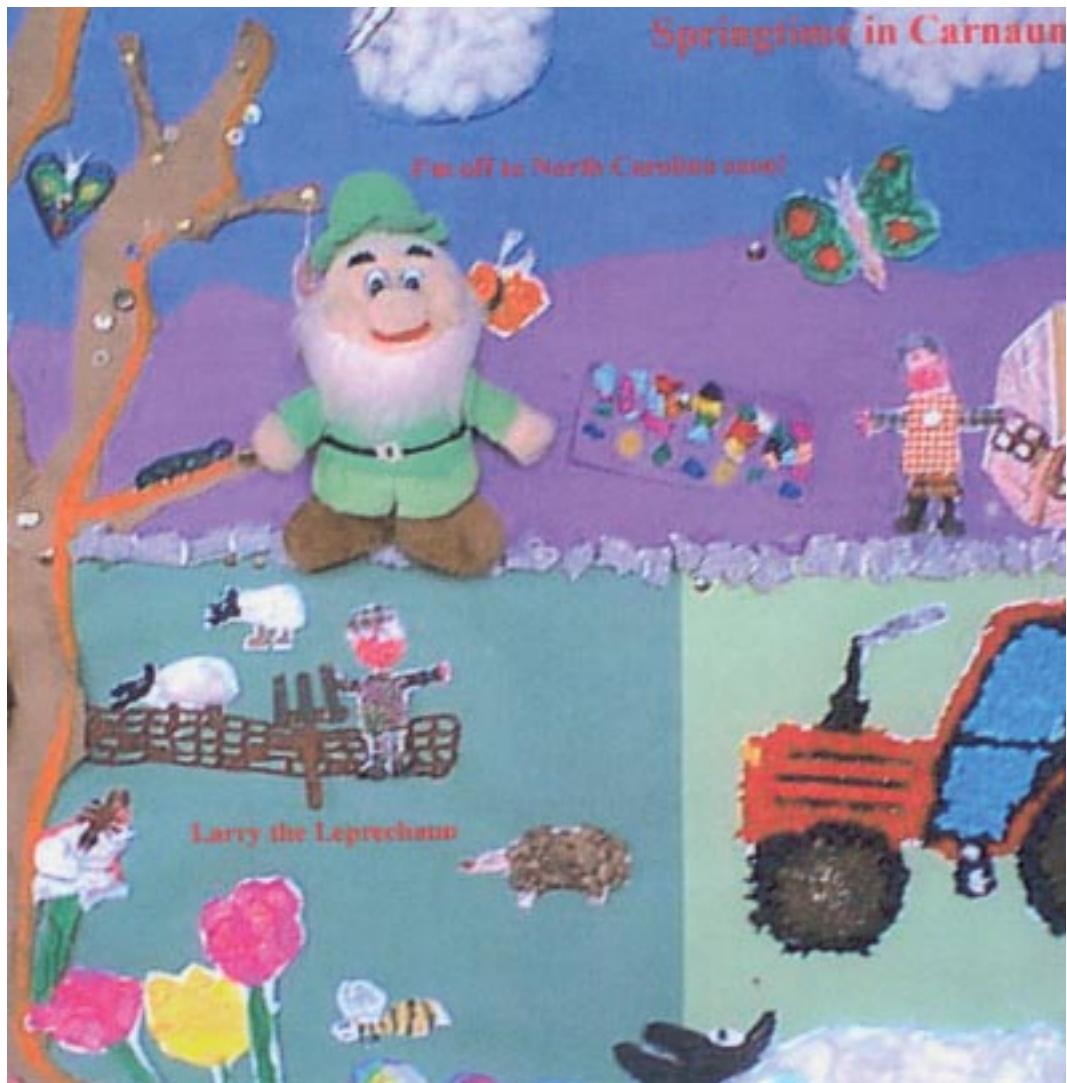
- compare old transport routes in other parts of Ireland, for example, routes along canals, river routes, long distance paths, pilgrims trails, etc.

Schools situated along the route of a canal or river could collaborate at a local level by examining local history and reliving old routes and journeys.

A mascot exchange project

Mascot exchange projects can promote understanding of different cultures and life-styles. Exchange projects also offer opportunities for cross-curricular learning, for example, Language, SPHE and SESE.

The mascot exchange project is suitable for younger children, as there is a real as well as a virtual exchange involved. In this example, the school in Ireland sent a leprechaun as the mascot to a partner school in the US, while the US partner school sent a bumblebee. In many cases a teddy bear is used.



Third and Fourth Classes, Carnaun N.S., Carnaun, Athenry, Co. Galway

Exemplar Nineteen

A mascot exchange project

| Curriculum Area/s | Strand/s | Strand unit/s |
|--------------------------------------|---|--|
| Language: English | Competence and confidence in using language Emotional and imaginative development through language | Developing competence and confidence in writing. Developing emotional and imaginative life through writing. |
| Gaeilge | Scríobhnóireacht | Ag úsáid teanga |
| SESE: Geography | Human environments | People and other lands |
| Social Personal and Health Education | Myself and others Myself and the wider world | Relating to others Developing citizenship |

Approaches and methodologies

- oral language
- talk and discussion
- drafting, editing and redrafting writing, writing for different audiences and different purposes

Level

Junior and middle classes

Objectives

- The child should be enabled to
- exchange e-mails with a partner school
 - develop critical analysis skills and reflection on own written work
 - learn about daily life in another part of the world.
 - Ba chóir go gcuirfí ar chumas an pháiste scríobh do léitheoirí agus d'éisteoirí eile.

ICT resources

the Internet, word processing software.
scanner, scanning software and digital camera

Other resources

Pencils and paper, (writing journals), crayons.

Preparation activities

Schools will have established links with another school, for a common interest, e.g. Gaelscoileanna. Information on partnering with schools in Europe is available through the European Schoolnet.

Methodology

1. One school sends a mascot such as a teddy to the partner school.
2. Different children take the mascot home and then individually write and then send written accounts by email of the mascot's experiences to the other school. Such an activity can be a very exciting for children if the exchange happens between children from different cultures. Gaelscoileanna and schools in the Gaeltacht may decide to collaborate using Gaeilge. Photographs taken with a digital camera can also be sent via e-mail.

Extension activities

Children could

- share ideas on their favourite sports, how they get to and from school, their home, pastimes, favourite foods, etc.

Schools can

- develop partnerships, and share information on their daily activities in real time.

Information on the Teddy Bear Exchange can be found at the International Education and Resource Network, which coordinates the project. <http://www.iearn.org.au/tbear/>

The next exemplar describes a collaborative project using e-mail, where the children created a joint story based on a character from a class novel.

Exemplar Twenty

An online project based on a character from a class novel

| Curriculum Area/s | Strand/s | Strand unit/s |
|------------------------------|---|--|
| Language: English | Emotional and imaginative development through language. Competence and confidence in using Language | Developing emotional and imaginative life through oral language, and writing. Reading - responding to text. Writing – developing competence, confidence, and the ability to write independently. |
| Approaches and methodologies | Oral language activity. Talk and discussion. | |
| Level | Third and fourth classes. This may also be adapted for other senior and junior classes. | |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> • express reactions to events and characters in stories • create stories and poems • discuss personal reading and writing • extend and develop his or her response to fiction <i>through discussion, and writing</i> • share responses to a variety of texts with a wider community of readers <i>through e-mail</i>. | |
| ICT resources | Word processing software (e.g., Microsoft Word) Internet access. Digital projector or large screen television. Scanner, scanning software and digital camera. | |
| Other resources | Pencils and paper, writing journals, art materials, crayons. <i>Flat Stanley</i> novel: Jeff Brown | |



Flat Stanley and his adventures
Third and Fourth Classes, Knockconan N.S., Co. Monaghan

Preparation activities

The *Flat Stanley* project can be integrated with a local studies project. The class will read *Flat Stanley*, and source partners from the list of schools.

Methodology

1. The children read *Flat Stanley* by Jeff Brown as their class novel. It's the story of a boy who is accidentally flattened by a falling notice board in the bedroom and the adventures he has as a flat person. This novel inspired the creation of the Flat Stanley Project website through which children in participating schools can send other Stanley characters to children in other schools in other countries. The class can join the project on <http://flatstanley.enoreo.on.ca/index.htm>.
2. The children make 'Flat Stanleys' from card, cut them out and laminate them in preparation for a journey.
3. The class then e-mail another school from the participating list, and ask that school to receive or host their Stanley.
4. The Stanley can then be sent complete with maps, brochures, postcards and photos and a partially completed diary of Stanley's experiences.
5. The host children then continue the diary and add more pictures before returning it to the initiating school. In this way, both schools learn about aspects of their lifestyles and cultures.

Extension activities

Children could

- submit stories and poems to the project web site, where there is a broad choice of cross-curricular activities available both on- and off-line.
- write collaboratively as a class
- publish their writing on the school web site.

Schools can extend their e-mail projects by setting up a videoconference as the following example illustrates:

Exemplar Twenty-one

Using e-mail and video-conferencing to learn about other cultures

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|---|---|
| Language: English | Competence and confidence in using language | Oral: developing competence and confidence in using oral language |
| SPHE | Myself and others Myself and the wider world | Relating to others Media education Developing citizenship |
| Approaches and methodologies | Talk and discussion, listening and responding, questioning, cooperative learning. | |
| Level | Middle and senior classes | |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> • initiate discussions, respond to the initiatives of others, and practice turn taking • speak and listen in a classroom environment where tolerance for the views of others is fostered • present ideas relevant to the topic in a logical sequence • practise the social functions of introducing others, greeting others, expressing appreciation • explore and understand how information is conveyed and practise relaying messages using a variety of methods • explore and use simple broadcasting, production and communication techniques (depending on class level). <p>Refer to curriculum objectives for specific classes.</p> | |
| ICT resources | <ul style="list-style-type: none"> • computer/many computers • internet access, • video conferencing equipment • digital projector or large screen television • word processing software (e.g., Microsoft Word) • scanner, scanning software and digital camera. | |

Other resources

Pencils and paper, crayons

Preparatory activities

Practice in writing e-mail, writing for different audiences and different purposes, using the spell checker. Preparatory activities in talking to groups of children in the class about their interests, activities, hobbies, etc. School links with partner school/s.

Methodology

1. Children communicate via e-mail with children in another school in this country or abroad. They compare aspects of the local environment, the weather, shops, how they travel to school and the sorts of work family members do.
2. Following a series of class interchanges, the two schools set up a video conferencing or simple NetMeeting opportunity, so that children can see each other. This greatly enhances a sense of interest and awareness of each other's communities that would not have been otherwise possible.
3. Motivation to communicate with this real external audience is very high, and the technology makes a significant contribution to extending and enhancing the children's outcomes.
4. The two teachers use e-mail to keep in regular contact to ensure the project is well planned, and learning objectives remain to the fore. The e-mails are constructed as a whole class and replies are posted onto a board for the whole class to read.
5. In order to practice speaking to a video conferencing camera before a live session, children may be grouped into threes so that they will all have an opportunity to introduce themselves. A number of children may be selected to represent the class for the main part of the video conferencing session. The class can prepare questions and answers beforehand to aid the live session.

An e-pals project

E-pals are pen-pals who use electronic mail. Although very similar to the regular pen-pal project, the use of e-mail offers much faster communication, and is ideal for international collaborative work. Participants can also edit each other's messages by adding to the message, rewording it, or commenting on it. Teachers can use a number of variations on this approach. Schools participating in these activities may be local or at a distance. This facility can be used to facilitate collaborative writing.

Exemplar Twenty-two

Using e-mail to support writing with a rotating story (epals)

| Curriculum Area/s | Strand/s | Strand unit/s |
|-------------------------------------|---|---|
| Language: English | Competence and confidence in using language Emotional and imaginative development through language | Writing: developing competence and confidence and the ability to write independently Developing emotional and imaginative life through writing |
| SPHE | Myself and others | Myself and others |
| Approaches and methodologies | Oral language will be the basis for the development of much work in this area Talk and discussion, drafting, editing and redrafting writing, writing for different audiences, encouraging self correction, questioning. | |
| Level | This approach may be achieved with all classes, if adapted. The current exemplar was used with third and fourth classes. | |
| Objectives | The child should be enabled to <ul style="list-style-type: none"> • create a collaborative story using e-mail exchange • draft, edit and redraft writing • critically examine his or her own work and learn to evaluate the work of others/ peers • develop an understanding of other cultures. | |

ICT resources

Word processing software (e.g., Microsoft Word)
Reference software (e.g., Microsoft Encarta), the Internet
Scanner, scanning software and digital camera

Other resources

Pencils and paper.

Preparatory activities

E-pals can be used to promote joint story writing. Preparatory writing is necessary so that the children focus their writing at the intended audience. Planning should take account of joint responsibilities for participating schools in relation to the editing and completion of the story.

Methodology

An e-pals project can be planned as follows:

1. The time-scale is decided in advance.
2. The schools decide the theme of the story.
3. Children in one school could write the first paragraph and e-mail it to the next school.
4. The second school adds to the story and forwards it to the third school.
5. The completed story can then be e-mailed to each of the participating schools.

Extension activities

Children could

- collaborate with a virtual writer in residence
- write on selected or agreed themes of common interest
- gain experience in sending e-mail, receiving e-mail, sending attachments, and using a digital camera.

Stanley and the Time Machine

**A collaborative class
story written and
illustrated by 3rd and
4th classes,
Knockconan N.S.**



**Published May 2001 by
Knockconan N.S.**

Knockconan, N. S. Co. Monaghan

The following exemplar describes an integrated approach, using e-mail, showing how a class collaborated with a partner school to describe the views from their classroom window.

Exemplar Twenty-three

A simple e-mail activity to enable children to communicate about their world through words and images

| Curriculum Area/s | Strand/s | Strand unit/s |
|--------------------------------------|--|---|
| Language: English | Competence and confidence in using language. Emotional and imaginative development through language. | Writing: developing competence and confidence and the ability to write independently. Developing emotional and imaginative life through writing collaboratively. |
| SESE: Geography | Human Environments Natural environments | Living in the local community People and places in other areas The local natural environment Weather |
| Social Personal and Health Education | Myself and others | Developing self confidence Relating to others |
| Approaches and methodologies | <ul style="list-style-type: none"> developing a sense of place and space, observing, recording and communicating, questioning. talk and discussion, drafting and redrafting writing, writing for different audiences, encouraging self correction. | |
| Level | First and second class. This may also be adapted for use with all classes. | |
| Objectives | <p>The child should be enabled to</p> <ul style="list-style-type: none"> use computer technology to construct a group e-mail message read e-mailed descriptions from other schools develop his/her ability to use precise and descriptive language, e.g., the use of adjectives | |

| | |
|-------------------------------|---|
| | <ul style="list-style-type: none"> • explore and understand how information is conveyed and practise relaying messages using a variety of methods • explore and use e-mail communication techniques. |
| ICT resources | <ul style="list-style-type: none"> • computer/s, Internet access , scanner, scanning software, • digital projector or large screen television • word processing software (e.g., Microsoft Word). • digital camera |
| Other resources | Pencils and paper |
| Preparatory activities | <p>Preparatory work can be done in the class with the children developing observation skills.</p> <p>The school sets up links with partner school. The topic of exchange should have a real purpose.</p> <p>Depending on the activity, a local school or school in another country may be more suitable. This activity is particularly motivational when done with a partner in a different geographic environment.</p> |
| Methodology | <ol style="list-style-type: none"> 1. The teacher explains to the children that they are going to exchange descriptions of what can be seen from the classroom window. 2. The class begins by describing common objects, such as fences and trees, in order to practise using the precise language necessary to clearly describe something in detail. 3. Then, working in small groups, children choose a view from one of the classroom windows. They write a detailed description of the view. They use descriptive words to help the reader "see" the view. These include not just adjectives and adverbs, but a lot of positional language about items in the view—trees, cars, what is in playground and so on. 4. The children draft and redraft their descriptions until the words used accurately describe the view. Finally the descriptions are e-mailed to the partner school. 5. The children in that school read the descriptions and create drawings, and paintings, as they interpret the descriptions. These pictures are then returned to the original school by ordinary mail. They can also be scanned into the computer and sent by e-mail as attachments. |

6. The initiating school receives the pictures and compares them to the actual views and to their descriptions. How adequate were their descriptions? Were there misleading or vague descriptions?
7. The children then take photographs of the views with a digital camera to send to the other school, so that they see the view described.
8. The roles can then be reversed. This activity can also serve as the basis for future collaboration between both schools.

Extension activities

Children could

- share descriptions of local economic activities, artefacts, buildings
- share examples of work completed in visual arts
- share information on local culture.

Video-conferencing

Video-conferencing enables teachers and children to communicate at a distance with teachers and children in other schools, either nationally or internationally. This is done by attaching a camera to a computer and using either the Internet or high-speed telephone lines. The easiest and cheapest way is probably through the Internet, using a program such as Netmeeting. While this is possible using an ordinary (PSTN) telephone line, the picture quality with an ISDN line is usually better. Dialling directly through an ISDN line is also possible and often results in improved picture quality, as it is independent of the volume of Internet traffic. Schools attempting to set up videoconferencing networks would need to address areas such as the management of the project, and the hardware and type of Internet connection available. Several schools are now using this technology to link up with other schools.

Video-conferencing can be used to

- communicate with a virtual visiting speaker (writer, poet, etc) without the need for travel
- link a geographically isolated school to other schools, for specific subjects, or for sharing of ideas and projects
- enable teachers working in isolated rural schools to exchange and develop their expertise in planning and sharing resources
- facilitate linkages with children in partner schools in other countries, or regions, thus promoting awareness of different cultures and different geographical areas
- facilitate children from different schools, counties or countries in collaborating on a project, or for other common interests
- allow teachers to collaborate with other teachers, from a distance.

A valuable usage of video-conferencing to support learning can be seen from the following example. The primary school on Cape Clear Island off the coast of West Cork was previously unable to receive specialist support through the peripatetic Learning Support Service for pupils with special needs. Through the medium of video-conferencing, this need has now been met very effectively. The island school is part of the West Cork ITN network and through involvement in a SIP project has access to video-conferencing facilities. The Learning Support teacher, while based in another school in the network, in Baltimore on the mainland, conducts weekly sessions by videoconference with one pupil with severe learning difficulties.

Dissolving boundaries through technology is a video-conferencing project between schools (primary and post-primary) in Northern Ireland and the Republic of Ireland. Groups of children and teachers from each side of the border link up with the aid of the project co-ordinator. A theme is agreed, and both groups work on content. While much of the collaboration is achieved through a web-based discussion forum, video-conferencing is used to enable cross-group ice-breaking discussions and to make the final presentation of the work. Opportunities to present findings to a group of children from another school can be a powerful motivator. Visit the project website at www.dissolvingboundaries.org.

Experts in residence

E-mail and video-conferencing can be particularly engaging and motivational for childrens' learning when collaborative projects with experts are established. An expert in residence is an expert in a particular field who is invited by the class teacher or the school to communicate with the children about some aspect of the curriculum. The expert may be an artist, a writer, a musician a poet, etc. In many cases, the expert follows up with the class via email and video-conferencing following a 'real' residence. For example, one class made contact with an author of children's books. The author communicated with the children about the stories in his books, and as the relationship developed the children began to send drafts of their own writing to the author. The returned drafts, complete with comments, added greatly to the writing experience of the children.

Setting up a virtual writer in residence scheme

- A virtual writer could be another teacher or, an author of children's literature who would respond to children's writing using e-mail.
- After reading and discussing a piece of work in class, children could email their questions and comments to the author, (or other person). They could also offer their own compositions on a selected theme.
- The virtual writer could then comment on the children's writing by email, and the children would redraft their writing

Schools are familiar with the Writers in Schools schemes funded by the Arts Council. Schools may also avail of virtual writers in residence. See <http://www.poetryireland.ie/education/schoolscheme.html>

Netd@ys projects

Netd@ys is a European Commission initiative, devised to promote the benefits of using new technologies as teaching and learning resources in the areas of education and culture. The Netd@ys project is an annual theme based event that promotes contributions from a range of education and cultural organisations. Schools seeking further information, and examples of previous project can find them at: <http://www.netdaysireland.ie/>
<http://europa.eu.int/comm/education/netdays/>

A Publishing tool

The facility for schools and classes to create their own website and web pages can be a powerful motivator, as it provides a forum for publication of children's school work, thereby opening a communication channel between schools, children, parents and others. Additionally, the results of joint research projects and collaborative activities with other schools can be published on the website.

The school web site can be used as the main portal site for children's searches, by providing links to materials relevant to particular subjects or age groups.

Teachers can get support and training in building a school website through the NCTE course – 'Creating a school website' www.ncte.ie

The training manual, *Practical Projects with ICT in the Classroom* (NCTE & INTO) includes a tutorial on making a simple school website using Netscape Communicator. This is an Internet editor, which children can learn to use. It can be used without a knowledge of HTML.

The Internet is an ideal tool for the dissemination of results of projects. It also provides other schools with the facility to interact on topics related to the project.

An example of a collaborative school project, co-ordinated by the ICT Advisor in the Education Centre, based on the work of twelve schools studying the local seashore which culminated in the creation of a website, can be viewed at: <http://www.sligoseashore.com/>.



Quilt of the Seashore project, fifth and sixth classes, Ballinlig N.S., Co. Sligo

Assistive technology and the Internet

The worldwide web is an invaluable resource for teachers in sourcing information on assistive technology devices, services and strategies for children in their schools. It also provides information on various medical conditions and disabilities as well as advice on educational and technical strategies for children with Special Educational Needs.

The worldwide web is also used as an educational resource by children. However, websites and their contents are not always designed with accessibility in mind. Guidelines that promote website accessibility for all users are now more common. These offer information for web designers, to enable them to make their sites more accessible. Some strategies provide alternative ways of retrieving information. Further information and full guidelines are available on the World Wide Web Consortium (W3C) website at www.w3.org. These guidelines are designed to help users who may

- have sensory or physical disabilities
- have reading or comprehension difficulties
- not be able to use standard access devices
- have other difficulties using technology.

Teachers need to be aware that many websites have pages or elements that are not accessible to some children. They should also, when designing or commissioning a school website, be aware that there are ways of ensuring it is accessible to all children and to people in the wider community.

Specific strategies which teachers can use to increase accessibility to websites for all users include:

For visually impaired children

- the computer screen display can be enlarged by decreasing the screen resolution (using the computer's control panel), or by increasing the font size for individual applications.
- free text-to-speech software is available for both MAC and PC systems. This software enables children with visual impairments to hear the web site contents being read aloud: Hear It! (MAC): <http://www.mac.tucows.com/preview/205274.html> Text Aloud (PC): <http://www.tucows.com/mmedia/preview/193526.html>

For physically challenged children

Once enabled, the StickyKeys tool in Windows operating systems (PC) can help a child with motor difficulty to more easily use the shift and control keys.

The Internet: uses for teachers

Planning – an information resource

The Internet can aid teachers in classroom planning as it offers access to an invaluable array of classroom and teaching resources, including lesson plans, teaching strategies, and professional literature.

Additionally teachers can

- access online software programs to support their teaching strategies
- access educational websites, galleries, museums, etc.
- research school tours and field trips, and prepare resource guides
- collect resources, including images and original materials, as aids to teaching
- use the Internet to prepare resource guides for children to guide their project work
- access materials to support ongoing professional development
- keep abreast of developments in education in Ireland and abroad.

The NCTE has many links that teachers will find useful on its resources section www.ncte.ie

A communication tool

E-mail offers teachers opportunities to communicate with colleagues and experts on a range of professional issues.

Teacher uses of collaborative tools on the WWW

There are a number of collaborative tools that teachers can use to collaborate with colleagues in other schools, and to share resources

A brief introduction to these is outlined below.

- *Mailing list*
A mailing list is a group of colleagues who share e-mails with each other on certain topics. Each e-mail sent acts as an open letter, so that everyone on the list can read the e-mail and respond.
- *Discussion group*
Users can participate in discussions of various educational topics on the many forums available on the INTO website. www.into.ie.
- *Chat rooms*
There are chat rooms specifically for teachers, for example www.into.ie. Chat-rooms facilitate real-time (actually happening at that time) discussion. A chat-room can be set for a particular project.

Appendices

Glossary of ICT Terms

| | |
|---|--|
| adventure game | A computer game, often set in a fantasy world, which involves exploration and decision-making |
| AUP, Acceptable Use Policy | An acceptable use policy (AUP) is a policy that a user must agree to follow in order to be provided with access to a network or to the Internet. It is common practice for schools to require that children (and parents) sign an acceptable use policy before being allowed access to the Internet. |
| bookmark | A simple function for marking the address (URL) of a web page and storing it in a special list on a web browser, also referred to as 'favourites' or a 'hotlist'. |
| broadband | Broadband is a general term used to describe high-speed Internet connectivity. browser See web browser. |
| cache | A place to store something temporarily. The files one accesses when looking at a web page are stored on the hard disk of the computer in a cache subdirectory, under the directory for the browser (for example, Internet Explorer). When a user returns to a page recently visited, the browser can retrieve it from the cache rather than from the original server on the web. |
| CD-ROM (compact disc read-only memory) | Similar to a music CD but it may contain information in the form of text, graphics, sound and moving video that can be accessed through a computer (a CD-ROM can store as much information as approximately 450 floppy disks) |
| closed circuit television (CCTV) | A television system used for private purposes and not for public or general broadcast. |
| computer-aided design (CAD) | CAD software is used by architects, engineers, artists, and others to create precision drawings or technical illustrations. CAD software can be used to create two-dimensional (2-D) drawings or three-dimensional (3-D) models. |
| computer virus | An unauthorised program or piece of code that inserts itself into a computer system, and then infects other computers via networks or disks, and has the effect of corrupting files and documents. |

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| concept keyboard | An alternative overlay keyboard used to input data into a computer. Concept keyboards can help children who find it difficult to use a conventional computer keyboard, e.g. younger children, and children with special needs. See also overlay keyboard. |
| control technology | Computer programs or equipment used to control mechanical and electronic devices. |
| database | A database is an electronic means of storing and filing data (information). It is organized so that its contents can easily be accessed, managed, updated and analysed. |
| desktop publishing (DTP) | An advanced text publication programme combining text, graphics and layout to produce a finished document. |
| digital | A system in which information is represented as a string of numerical values (0 and 1) that are interpreted as the information is used. Each digit is known as a bit and a string of bits that a computer can handle individually as a group is a byte. |
| digital projector | A digital projector is a specialized computer display that projects an enlarged image onto a screen or a wall. It is commonly used in presentations, and for classroom display where there is only one computer. |
| DVD (digital versatile disk) | The next generation of optical disc storage technology, essentially a bigger, faster CD that can hold video as well as audio data. |
| dot | The full stop in e-mail and web addresses. |
| download | To transfer a copy of an electronic file from a remote computer to another using a modem or network. |
| e-mail | An Internet service that allows users to send and receive messages and documents. |
| filtering software | A software program developed to sort and block access to undesirable material on the Internet. The software company generally compiles a list of banned sites and keywords. These may be added to by the user. |

| | |
|---|--|
| floor turtle/robot | A device that can be programmed to move in different directions, or to perform a task or a sequence of tasks |
| graphics | Pictures, diagrams, graphs and other images. |
| hand-held computers | Any small, portable device that provides computing, information storage and retrieval. Also referred to as personal digital assistants (PDAs). |
| hard disk | A fixed magnetic disk generally located within a computer, on which data can be saved. |
| homepage | See web page |
| HTML (hypertext markup language) | The set of mark-up symbols inserted in a file intended for display on a worldwide web browser page. Each individual mark-up symbol is known as a tag. The mark up tells the web browser how to display a web page's words and images for the user. |
| integrated learning system (ILS) | A software package that combines curriculum content in tutorial format with a management system to monitor and record the progress of the learner. |
| interactive software | Software that stimulates and facilitates responses from the user. |
| Internet | A global telecommunications network enabling computers around the world to share information. |
| ISDN | Integrated Services Digital Network: a set of standards for digital transmission over ordinary telephone wire. A user who has an ISDN line installed will have faster access to highly graphic websites. |
| ISP | Internet Service Provider: a company that provides individuals and companies access to the Internet and other related services such as website hosting. |
| LAN (local-area network) | A computer network within a limited geographical area. |

| | |
|--|--|
| laptop | A laptop is a portable personal computer: it operates in the same manner as a larger desktop PC, but it is considerably smaller in size and lighter in weight. A laptop contains a rechargeable battery, which allows it to be used away from a power supply for a limited time. |
| Logo | A computer programming language that can be used to create and manipulate shapes and patterns on screen or to control a screen or floor turtle. |
| mailing list | An e-mail address that transmits messages received to a number of other e-mail addresses linked to it. |
| multimedia | Presentation of text, graphics, video, sound, and animation in an integrated way. |
| multimedia authoring software | A computer program that allows the user to create documents that contain text, graphics, sound and video. |
| net | See Internet |
| network | Computers that are connected together and can communicate with each other or share resources such as computer programs or printers. |
| operating system | A program that controls the overall operation of a computer system, typically performing such tasks as memory allocation, job-scheduling, and input-output control. |
| optical character recognition (OCR) | A software program that converts shapes on a faxed or scanned page into a text document. |
| overlay keyboard | A rectangular, touch-sensitive device connected to the computer, divided into a grid onto which a sheet of paper containing pictures and words can be placed, which when pressed causes pre-programmed graphics or text to appear on the screen or sounds to be played. |

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| Personal Digital Assistant (PDA) | PDA's or personal digital assistants, are portable digital devices, usually designed to fit in one's pocket, which can store documents, spreadsheets, calendar entries, games, databases, and lots of Other resources normally associated with a laptop or desktop computer. They are designed to utilize small, low-bandwidth files and applications. |
| portable computer | See laptop |
| portal | A website that is or proposes to be a major starting site for users when they get connected to the Web or that users tend to visit as an anchor site. An educational portal may be perceived as a 'one stop shop' to other educational websites. |
| presentation software | Software that is used to create multimedia slides. |
| PSTN | Public Switched Telephone Network, the term to describe the world collection of voice-oriented telephone networks. It is mainly digital today, except for the final link from the exchange to the user. |
| program | A sequence of coded instructions fed into a computer enabling it to perform specified operations. |
| spreadsheet | An application that can be used to store and display and analyse numerical data, the results of which can be represented in graphical form. |
| simulation | A software programme which provides a simulated or scenario environment, where the user can explore environments and solve problems in a controlled situation. |
| turtle (turtle graphics) | A mechanical floor turtle or a symbol on a computer screen that can be programmed to produce images or mathematical patterns. (generally associated with Logo). |
| video-conferencing | Communication between two or more groups of people who are in different places, but can see and hear each other using electronic communications. |
| virtual reality (VR) | A computer interface that gives the user the experience of being completely involved in the environment it describes. |

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|---|--|
| walled garden | On the Internet, a walled garden is an environment that controls the user's access to web content. In effect, the walled garden directs the user's navigation within particular areas, to allow access to a selection of material, or prevent access to other material. It can be a protected Internet environment for children. |
| web browser | A software application, such as Mosaic, Netscape Navigator or Internet Explorer, that displays web pages on the screen, and facilitates the use of the worldwide web. |
| web page | A document published on the worldwide web that may contain text, pictures, sound, video, and links to other web pages |
| website | A collection of logically connected and linked web pages. |
| web portal | See Portal. |
| web-whacking | A specific piece of software which allows the user to download an entire web site onto the computer hard drive or to save onto a CD- Rom. This enables the user to view the site offline later and when an Internet connection is not available. |
| Wireless Local Area Network (WLAN) | A wireless LAN is one in which a mobile user can connect to a local area network (LAN) through a wireless (radio) connection. worldwide web A hypertext-based information system for the Internet |

List of Exemplars

| Number | Title | ICT used |
|--------|---|--|
| 1 | Develop personal writing | Word processing |
| 2 | Letter writing as part of a project on the Great Famine | Word processing |
| 3 | Creating a classroom magazine | Desktop publishing |
| 4 | Focus observational skills | Paint and draw |
| 5 | Editing digital images to create interesting landscapes | Image editing |
| 6 | Creating textile designs using art and design software | Image editing |
| 7 | Creating animated objects | Multimedia authoring |
| 8 | The Great Famine in a west of Ireland town | Multimedia authoring |
| 9 | Local history project: shop fronts | Multimedia authoring |
| 10 | A heritage project on fields and fences | Multimedia authoring |
| 11 | Responding to a class novel | Concept mapping |
| 12 | A class survey | Spreadsheet software |
| 13 | Develop concepts of line and angles | Programming software: LOGO |
| 14 | Design and make a scene from a story | Control Technology; Lego Mindstorms |
| 15 | Countries of the world | Reference software |
| 16 | World buildings | A hotlist using the Internet |
| 17 | Subject sampler on local history | Internet |
| 18 | A co-operative project on the West Clare Railway | E-mail |
| 19 | Mascot exchange project | E-mail |
| 20 | An online project based on a character from a class novel | E-mail and Internet |
| 21 | A collaborative project to learn about other cultures | E-mail and video-conferencing |
| 22 | An e-pals project: writing a rotating story | E-mail |
| 23 | A project to communicate about the child's world through words and images | E-mail |
| 24 | Dissolving Boundaries | Video Conferencing |

Educational Resources

The following list includes resources, which have been supported in some way by the Department of Education and Science. Many of the websites listed provide external links to other websites which offer additional resources for using ICT to enhance teaching and learning in the Primary School.

CD ROMs

ICT and the primary curriculum resource CD

This CD ROM was developed by the NCTE and INTO to support in-career inservice development in ICT.

Intel teach to the future

This CD ROM accompanies a training manual, developed by Intel Ireland Ltd, and modified by the NCTE for the Intel Teach to the Future course for teachers.

Paper-based Resources

Intel teach to the future (Intel Ireland Ltd, 2001)

This training manual and accompanying CD-ROM have been modified by the NCTE. The manual offers guidance on multimedia presentations, as well as many useful links to websites offering lesson plans.

ICT planning and advice for schools (NCTE, 2002)

This offers guidance to schools on planning the effective use of ICT. It also provides very useful advice sheets on ICT equipment, peripherals, networking and software.

Special Educational Needs and information and communication technology. (NCTE, 2000)

This book offers information and advice on the use of ICT with children with Special Educational Needs (SEN).

Evaluating Educational Software: A Teacher's Guide (NCTE, 2001)

This handbook features a software evaluation framework which was developed by the NCTE for use in its national software evaluation programme.

Practical Projects with ICT in the classroom (NCTE & INTO, 2002)

This training manual accompanies an ICT inservice course designed by the NCTE and INTO, which was first delivered in summer 2002.

LOGO ar scoil

This booklet was developed by Grúpa Múinteoirí Ríomhaireachta in Oirthear Corcaí. It offers guidance on the use of LOGO, including pre-LOGO work, basic commands, teaching strategies, and ideas on integration with the curriculum.

Websites

www.cesi.ie

This is the website of the Computer Education Society of Ireland. The CESI website provides a range of resources for using ICT to support teaching and learning.

<http://www.dataprivacy.ie/>

The website of the Data Commissioner provides information on data privacy, and the Data Protection Act.

www.education.ie

The Department of Education and Science website provides access to policy documentation relating to ICT.

www.eschola.org

This is the designated website for eSchola, an eLearning awards project, managed by European Schoolnet.

www.eschoolnet.org

This is an educational portal for schools in Europe, and is hosted by European Schoolnet.

www.eun.org

This is the website of European Schoolnet, an international partnership of more than 20 European Ministries of Education.

<http://www.fkbko.net/>

The For Kids By Kids Website, provides guidelines on Internet Safety for children's use of the Internet.

www.iab.ie

This is the national website of the Internet Advisory Board. It provides information on safe use of the Internet by children.

www.into.ie

The website for the Irish National Teachers Organisation provides information and resources for teachers, including information on the use of ICT in the primary school.

www.ippn.ie

This is the website of the Irish Primary Principals' Network. It provides information on school management and curriculum issues, including ICT.

www.ncca.ie

This website of the National Council of Curriculum and Assessment provides information on matters relating to curriculum and assessment in Ireland.

www.ncte.ie

The website of the National Centre for Technology in Education provides useful information and resources to schools on managing ICT in schools.

A full list of Education Centre websites is also accessible on the NCTE website. The Education Centre websites provide ICT information and resources for Irish teachers at local level.

www.pcsp.ie

The Primary Curriculum Support Programme website provides materials and downloadable resources to support implementation of the Primary School Curriculum.

www.scoilnet.ie

This portal for Scoilnet provides a range of teaching and learning resources for ICT integration.

www.sdps.ie

This is the website of the School Development Planning Support (Primary) and provides guidance on school planning.

Online Projects

www.dissolvingboundaries.org

The Dissolving Boundaries project website features work carried out by schools in a cross-border project using computer conferencing and videoconferencing.

www.riverofdreams.ie

This River of Dreams project website features the work of schools, which participated in a project on the River Shannon, supported by the NCTE. This project has also been published on DVD by the Department of Arts, Heritage, Gaeltacht and the Islands.

www.sip.ie

SIP online is a portal for schools involved in Schools Integration Project, which was managed by the NCTE. It provides detailed descriptions of project work by participating schools.

Assistive technology websites

www.cast.org

The website of the Center for Applied Special Technology provides resources on the use of technology to expand opportunities for all children and adults, especially those with disabilities.

www.enabletech.ie

This website provides guidelines for the use of assistive technology in teaching and learning.

www.w3.org

This World Wide Web Consortium (W3C) website provides information on interoperable technologies as part of its Web Accessibility Initiative (WAI).

Other Educational Websites

www.spinaweb.ie

This Spin a Web website provides guidance on website design. It also showcases entries in the annual Spin a Web competition, managed by the Department of Computer Science in Trinity College.

www.teachnet.ie

Created by St Patrick's College, Drumcondra, this website contains practical information and advice for teachers on how to get the best out of their use of the Internet in the classroom.

www.tobar.ie

This is an Irish language website which provides resources and encourages teachers to develop and share resources through the website in support of the revised primary curriculum.

Schools Integration Projects in Primary Schools

Many of the exemplars used throughout the guidelines originate from work by schools involved in the Schools Integration Project (SIP) one the major initiatives of Schools IT 2000, which was managed by the NCTE. SIP was designed to encourage innovative practice in Irish schools. The NCTE supported all of the projects by providing advice, financial support and organisational backing. SIP comprises almost 90 different projects, 64 of which are based in primary schools. These primary school projects can be loosely classified into the following six themes or categories.

1. Science & Mathematics (4 projects)
2. Humanities & Languages (29 projects)
3. Special Educational Needs (6 projects)
4. Culture & the Arts (2 projects)
5. Technical/Internet (12 projects)
6. SIP projects Information Age Towns (11 projects)

While these projects can be classified into these six categories, the reality is a highly diversified collection of projects that cover a range of topics and issues. It is not just the content of the projects that varies, the innovative ideas put forward in the schools project proposals, determined the aims, approaches and framework of each SIP project. While some primary schools worked alone others worked in groups, with a lead secondary school or through their local education centre. In total 240 Primary schools were involved in SIP projects.

SIP Online acts as a portal for all schools involved in SIP to disseminate their results and experiences. SIP Online offers teachers detailed descriptions of each of the projects outlined below and is available at: www.sip.ie

SIP Projects

1. Science & Mathematics category

SIP 005: Control technology Empowering Minds

This project explored and implemented a programme for the use of control technology with primary school children.

SIP 007: Thinking and doing - Primary Science and ICT

This project explored the use of ICT in the teaching and learning of primary science across the age and ability range in an urban, technology-poor, all-girls school.

SIP 008: Integrating ICT and Mathematics in the Primary Curriculum

The project aimed to continue the integration of ICT with the revised Maths curriculum and to further develop its use with deaf children and with special needs children within this newly amalgamated school.

SIP 049: Aspects of Science (Primary Science & ICT)

This project aimed to develop children's practical and theoretical science skills by using technology to enhance their learning experiences.

2. Humanities & Languages category*SIP 010: Social, Environmental and General Education*

A project that supported the development of an ICT infrastructure in a number of small, rural primary schools, trained teachers in ICT and engaged children in cross-curricular collaborative projects.

SIP 015: The Computer as a cross-curricular mediational tool in the Primary school

This project aimed to create an educational learning environment that enabled ICT to be incorporated in a mediational role across the traditional curriculum rather than as a stand-alone subject.

SIP 016: A sociological study of shopping

This project engaged pupils in research, report writing, teamwork, communication of ideas, presentation techniques and ICT integration, all within the context of the shopping habits of children's parents.

SIP 017: European Studies

Using ICT, this project set out to develop a European Studies programme suitable for the needs of 25 primary school pupils across the four senior classes (3rd, 4th, 5th and 6th classes).

SIP 018: Children as authors and publishers

This project set out to cultivate the imagination of children by allowing free expression of their own ideas and acknowledging the value of such expression to themselves, society and posterity. Their awareness of how technology can contribute to communication was increased.

SIP 019A: The River Suir -- Its people, environment, history and economy

One of 11 loosely affiliated projects in SIP 019 focusing on the theme of local history, the environment and culture. This project was designed to enhance children's appreciation and understanding of their environment through active participation in researching aspects of the River Suir.

SIP 019B: Coalmining -- A collaborative project with a school in Wales

One of 11 loosely affiliated projects in SIP 019 focusing on the theme of local history, the environment and culture. Exploring the subject of local coalmining activities during the 1600s, this project involved the production of a content-rich CD-ROM.

SIP 019C: The history and culture of Clonard

One of 11 loosely affiliated projects in SIP 019 focusing on the theme of local history, the environment and culture. This project deals with the history of Clonard, which is situated close to the site of a 5th century monastery, as perceived by local children.

SIP 019D: The upper Dodder valley and its environs

One of 11 loosely affiliated projects in SIP 019 focusing on the theme of local history, the environment and culture. This project studied the course of the Dodder River from its source to the Firehouse Weir examining the flora, fauna, waterworks, geology and historical sites.

SIP 019E: Local history of Castlebar and Mayo

One of 11 loosely affiliated projects in SIP 019 focusing on the theme of local history, the environment and culture. Focusing on local historical events of significance, this project involved the production of a educational CD-ROM for distribution throughout the locality.

SIP 019F: Compilation of a booklet on the history of Westport

One of 11 loosely affiliated projects in SIP 019 focusing on the theme of local history, the environment and culture. Engaging in a study of the local history of Westport, this project used folklore and cultural events to highlight the richness of the environment ultimately producing a booklet and workbook for classroom use.

SIP 019G: Celebrating the life of William Hague, Architect 1836-1899

One of 11 loosely affiliated projects in SIP 019 focusing on the theme of local history, the environment and culture. This project examined the work of celebrated local architect, William Hague, researching examples of his work in the locality

SIP 019H: Local culture & heritage and a review of COPS

One of 11 loosely affiliated projects in SIP 019 focusing on the theme of local history, the environment and culture. This project reviewed the use of COPS software, evaluated various authoring programs and produced a CD-ROM about local history and culture.

SIP 019I: The faith history of Slane

One of 11 loosely affiliated projects in SIP 019 focusing on the theme of local history, the environment and culture. This project researched the Faith History of Slane and used ICT to compile and present their findings.

SIP 019J: The 1937 schools heritage project revisited

One of 11 loosely affiliated projects in SIP 019 focusing on the theme of local history, the environment and culture. It examined the 1937 Schools Heritage Project as it relates to the hinterland of Coachford National School.

SIP 019K: Multimedia authoring partnership

One of 11 loosely affiliated projects in SIP 019 focusing on the theme of local history, the environment and culture. This project integrated ICT into the school curriculum, working towards multimedia presentations of the children's work.

SIP 020: A sense of Japan

Using ICT, multimedia, Internet and e-mail, this project focused largely on life in Japan with an emphasis on young people, school, sports, art, music and technology

SIP 021: The use of ICT in Teaching Modern Languages

A broad-based project that aimed to raise primary school children' awareness of European languages and cultures.

SIP 022: Awareness, appreciation and enhancement of the local environment

Using ICT as an integral feature in preparing and writing material, collating data, communicating between the partner schools, this project comprised a comprehensive study of the local environment.

SIP 023: The marine

A thematic project involving all class groups that examined the ecology of the seashore, the issues relating to the fishing industry, the history of our involvement with the sea, and the current state of fishing and cargo ports in the vicinity of the school.

SIP 054: Electronic archive of the local area

This project focused on historical sites and geographical features of the locality with participating schools creating content for a local website. This project was led by a secondary working with local national schools with the desired result to enable Primary school children to see the post-primary school as an extension of the learning process.

SIP 056: The development of oral and aural language skills at infant and remedial levels

This project looked at enhancing the language learning of both infant and remedial children by using multimedia ICT in a thematic, consistent, progressive, diagnostic and calculated manner at home and at school.

SIP 061: Exploring the field fences of Co. Sligo

One post-primary and eight primary schools were involved in researching, collating and documenting the information for this project, which aimed to increase children's awareness of their local heritage and improve their ICT skills.

SIP 064: Developing a local community-based network through integration of ICT in curriculum

This project used ICT to develop network links between a number of schools. It developed the ICT skills of staff and children, promoted the value of technology in learning and teaching new skills and fostered inter-school linkages.

SIP 072: KidSmart

A project which tested and evaluated the suitability of the Young Explorer Early Learning Centre in Irish schools. This was developed out of an IBM initiative in the US entitled KidSmart Early Learning Programme.

SIP 073: The use of Illuminatus as a creative presentation and assessment tool in the primary school

This project involves teachers and senior-level primary school pupils acquiring multimedia skills (HyperStudio and Illuminatus) and utilising these skills to plan, develop and present class projects.

SIP 075: Tru PC - The teaching of reading using peers and computers

This project is investigating the effectiveness of using ICT in teaching reading to pupils in a learning support environment.

SIP 082: European Studies

This project involves primary school children researching the incidence of bullying in 5 local schools, using ICT to gather, record and disseminate their findings.

SIP 083: A review of software for the infant school

A project that aims to identify software appropriate for use in the infant school so as to aid the teaching of core subjects.

3. Special Educational Needs

SIP 009: ICT in teaching mathematics and english

This project developed a programme which integrated the use of ICT in the delivery of the English and Mathematics curricula.

SIP 026: The role of ICT in learning support

This project explored the use of ICT as a motivational tool in teaching and as a learning medium for pupils in small, rural schools. It also integrated ICT into a whole-school learning support strategy for weaker children/potential early school leavers.

SIP 027: Open and distance learning for circus and fairground families

This project examined the use of ICT to provide a more comprehensive education to pupils from circus and fairground families.

SIP 029: Special Education Access to Knowledge (SPEAK)

This project aimed to make existing and new technologies (videoconferencing, e-mail and the Internet) child-centred and meaningful for children with special needs.

SIP 030: SOLAS

This project piloted a regional assistive technology support service to meet the educational needs of pupils with physical and sensory impairments in primary and post-primary education.

SIP 048: Using IT to improve the literary skills of mild learning disabled adolescent children studying the Junior Cert School Programme

A discrete piece of action research involving a group of mildly learning disabled adolescents aged 13 to 18, this project aimed to determine whether access to ICT improved their literacy levels.

SIP 067: The SPEAR Project (Special Education Assessment and Resource Centre)

This project established an ICT educational services centre providing resources and support to all those involved in special needs education. It enabled them to access modern technology in order to enhance the lives of those with disabilities.

4. Culture & the Arts

SIP 035: Eur-Opera: A collaborative european initiative in writing and producing a children's opera

This project involved the creation and production of an original children's opera on a common theme relevant to the age and cultures of the participating children.

SIP 060: The Use of ICT in teaching the history of art

This project explored the use of ICT to enhance the teaching of art history at Leaving Certificate level, with children developing a reference CD-ROM using a range of software programs.

SIP 062: CELT (Community Empowered Learning through Technology)

A project that aimed to transcend the disadvantages of living and learning in a geographically remote area. Children worked on Internet-based collaborative projects about different cultures, and the local community became involved in these projects and undertook ICT training courses.

SIP 068: Comparaid agus cogarsnacht idir milaois 1000 agus milaois 2000

This project involves primary and second-level pupils using ICT and Other resources to research how people live in Ireland today versus how they lived 1,000 years ago, and to compare and contrast the two lifestyles. The Irish language will be the medium of communication between all project participants.

5. Technical/Internet

SIP 036: Classroom of the future

Examining the impact of broadband Internet access on learning and teaching within primary and post-primary schools, this project involved children and teachers undertaking curriculum-related activities that placed heavy emphasis on the technologies being investigated.

SIP 037: Second Level/Primary Education: A project in sharing resources and curriculum development

This project involved one school sharing its ICT resources and expertise to assist the development of ICT in five small local primary schools. All were involved in a curriculum development project between primary and post-primary education.

SIP 039: Preparation of a primary school website

This project engaged children from two schools in researching, developing, designing and producing a website which listed the amenities in the local hinterland.

SIP 040: A transnational environmental project

This project developed educational applications for an Internet-based system that fits with common educational and curriculum themes, promoted local culture, created interest from outside and with scope for involving other EU members.

SIP 041: The Thin-client server solution in Irish schools

This project explored the sustainability of a schools ICT infrastructure by setting up a network of 30 thin-client network clients in a dedicated computer room with access to normal Windows desktops using Citrix Metaframe.

SIP 043: Startech -- learning together

A project that examined the application of technology as a tool/resource to enhance curriculum delivery in primary schools in West Cork.

SIP 046: Dublin Inner-city Schools Computerisation Project (DISC)

This project aimed to upgrade each participating school to full multimedia computer capacity, together with coordinated basic ICT training for teachers, and the location and evaluation of relevant educational software across the educational spectrum.

SIP 047: WFL

This project aims to empower teachers with the capability to share resources and knowledge within and across primary and post-primary schools. It also aims to facilitate communication and collaboration between schools, parents and the wider community.

SIP 070: Sun Microsystems pilot project

This project focused on using e-mail, web design and other technical skills to research and collate information for two different projects. One looked at Dublin's Grand Canal, ie, its history, geography, flora, fauna and engineering, and one looked at integrating ICT into everyday classroom activities and developing individualised learning materials for children with moderate learning disabilities.

SIP 079: A model for technical support

This project explored the technical problems that impeded use of ICT in some rural schools and delivered appropriate troubleshooting courses to help overcome these issues.

6. Information Age Towns

SIP 055: Kilkenny Information Age Schools

Kilkenny Information Age Town was established in order to position Kilkenny at the forefront of ICT developments and to create an awareness of and competency in ICT across all sectors. Eight separate SIP projects were undertaken involving 19 schools, 13 of which were primary.

SIP 058: Ennis Information Age Schools

This SIP project brings together six primary schools and two special schools in Ennis, Ireland's Information Age Town. The schools worked together to investigate the challenges that face schools when they have an abundance of ICT equipment. See individual projects for more information.

SIP 059: Dundalk Learning Network

Dundalk Learning Network involves the use of web-based technologies to enhance communication between 17 local schools and between the schools and the wider community. The backbone of the project is a core of innovative technology solutions, housed in a framework called Wired for Learning, which is tailored specifically to address local needs

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 Carnaun NS, Carnaun, Athenry, Co. Galway
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 Clashmore NS, Clashmore, Co. Waterford
 St. Colman's NS, Belmont, Mullingar, Co. Westmeath
 Scoil de hÍde, Moate Park, Co. Roscommon
 Monastery CBS, Tipperary, Co. Tipperary
 Gaelscoil Sheoirse Clancy, Southill, Limerick, Co. Limerick
 Scoil Náisiúnta Cill na Martra, Magh Cromtha, Co. Chorcaí
 St Paul's, Cope Foundation Montenotte, Co. Cork
 Knockconan NS, Emyvale, Co. Monaghan
 St. Brigid's Special NS, Árd Easmuinn, Dundalk, Co. Louth
 Sacred Heart School, Church Avenue, Portlaoise, Co. Laois
 St. Philomena's NS, Convent Road, Tullamore, Co. Offaly
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 Scoil Mhuire, Letterkenny, Co. Donegal
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 Empowering Minds Project, Media Lab Europe, Dublin 8.

In the case of some copyright material the publishers have been unable to contact the copyright holders but will be glad to make the usual arrangements with them should they contact the publishers.

Membership of the Combined Primary and Post Primary Working Group for Information and Communications Technology

Chairperson:

Paul Brennan (*to 2002*)
Sarah Fitzpatrick (*from 2002*)

Committee members:

Paddy Bates Computer Education Society of Ireland (CESI), Primary representative

Deirdre Butler St. Patrick's, Drumcondra

Joe Codyre Post primary Inspector , Department of Education and Science (DES)

Pat Conway Teachers Union of Ireland

Kathryn Crowley (*to 2002*) Irish National Teachers Organisation
Síle Chuinneagáin (*from 2002*)

Eddie Guilmartin Computer Education Society of Ireland (CESI) Post Primary representative

Séan Ó Floinn (*to 2000*) Primary Inspector, Department of Education and Science (DES)
Frank Kelly (*from 2000*)

Rosemarie Ferriter Association of Secondary Teachers of Ireland

Michael Hallissey (*to 2002*) National Centre for Technology in Education
Anne White (*from 2002*)

Aidan Mulkeen NUI

| | |
|---|---|
| Education Officers | Diane Birnie (<i>to 2001</i>) Gary O' Donnchadha (<i>to 1999</i>) Valerie O'Dowd, (<i>to 2000</i>) Pat O'Neill (<i>to 2000</i>) Cathal de Paor (<i>to 2002</i>) Anne Moloney, (<i>from 2003</i>) Mary O'Leary, (<i>from 2003</i>) |
| Director | Bill Lynch, Post Primary |
| Primary Co-ordinator | Paul Brennan (<i>2001 to 2002</i>) |
| Deputy Chief Executive, Primary | Lucy Fallon-Byrne (<i>to 2001</i>) Sarah Fitzpatrick (<i>from 2002</i>) |
| Deputy Chief Executive, Post Primary | John Hammond |

Membership of the Steering Committee for Information and Communications Technology

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| Chairperson: | Noel Lindsay (<i>to 2000</i>) | |
| Committee members: | Catherine Byrne | Irish National Teachers Organisation |
| | Paula Carey | Irish Congress of Trade Unions |
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| | Mr. Eddie Guilmartin | Computer Education Society of Ireland |
| | Seamus Greene | Joint Managerial Body |
| | Aeden Hall | Information Society Commission |
| | Frank Kelly | Department of Education and Science |
| | Fionnuala Kilfeather | National Parents Council, Primary |
| | Maureen Killeavey | Irish Federation of University Teachers |
| | Raymond King | Catholic Primary School Managers Association |
| | Charlie McManus | Irish Vocational Education Association |
| | Doreen McMorris | Department of Education and Science |
| | Jerome Morrissey | National Centre for Technology in Education |
| | John Mulcahy | Association of Secondary Teachers of Ireland |
| | Robert Poynton | Irish Business and Employers Association |

Paul Quish

National Parents Council-
Primary

Sandra Wilson

Church of Ireland General Synod
Board of Education

Education Officers

Diane Birnie (*to 2001*)

Gary O' Donnchadha (*to 1999*)

Pat O'Neill (*to 2000*)

Marion Palmer (*to 1998*)

**Assistant Chief
Executive, Primary**

Lucy Fallon-Byrne (*to 2001*)

Chief Executive

Albert Ó Ceallaigh (*to 2001*)

Ms. Anne Looney (*from 2001*)

