

ICT in Schools

Inspectorate Evaluation Studies

PROMOTING THE QUALITY OF LEARNING



A N R O I N N O I D E A C H A I S | D E P A R T M E N T O F
A G U S E O L A Í O C H T A | E D U C A T I O N
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INSPECTORATE



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Abbreviations

AP	assistant principal
AUP	acceptable use policy
BOM	board of management
CAD	computer-aided design
CEB	Commercial Examining Board
CESI	Computer Studies Society of Ireland
CPD	continuing professional development
DES	Department of Education and Science
ECDL	European Computer Driving Licence
EGFSN	Expert Group on Future Skills Needs
ERNIST	European Research Network for ICT in Schools of Tomorrow
ESI	Education Services Interactive (Project)
EU	European Union
FETAC	Further Education and Training Awards Council
ICD	in-career development
ICT	information and communications technology
ISC	Information Society Commission
LC	Leaving Certificate (Established)
LCA	Leaving Certificate—Applied
LCVP	Leaving Certificate Vocational Programme
LSRT	learning-support resource teacher
MLE	managed learning environment
NCC	National Competitiveness Council
NCCA	National Council for Curriculum and Assessment
NCTE	National Centre for Technology in Education
NPADC	National Policy Advisory and Development Committee
OECD	Organisation for Economic Co-operation and Development
PCSP	Primary Curriculum Support Programme
PISA	Programme for International Student Assessment
SCR	student-computer ratio
SDP	school development planning
SDPI	School Development Planning Initiative (Post-primary)
SDPS	School Development Planning Support (Primary)
SDT	special-duties teacher
SESE	Social, Environmental and Scientific Education
SESS	Special Education Support Service
SIP	Schools Integration Project
TIF	Telecommunications and Internet Federation
VEC	Vocational Education Committee
VLE	virtual learning environment
WSE	whole-school evaluation

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Foreword

Information and communication technology has brought profound changes to almost all aspects of our lives in recent years. It has transformed activities as basic as how we work, communicate with each other, treat illnesses, travel, shop and enjoy our leisure time. The pace of change shows no sign of slowing: indeed, the development of ICT and its applications to areas such as the integration of media, are continuing at even faster rates than heretofore. In a relatively short period of time, ICT skills have become as fundamental to living a full life as being able to read, write and compute.

Ireland has been a leading player in the development of the ICT industry. We have been a leading exporter of ICT hardware and software, and many of the key businesses in the industry have important bases here. Like other countries, we have also recognised that if our young people are to live full lives in a world transformed by ICT, they need to have opportunities to acquire and develop ICT skills from an early age. Since the late 1990s, we have made considerable investments in ICT infrastructure in schools, and in training for teachers and other professionals. Until now, little national research evidence has been published on the impact that the new technologies have had on schools and especially on teaching and learning. This report examines the extent to which ICT has been used in schools at both primary and post-primary levels and, more importantly, assesses the impact that ICT has had on teaching and learning, including the ways in which ICT is used to support the learning of students with special educational needs.

The evaluation shows that while much progress has been achieved in the roll-out of ICT in schools, considerable challenges remain. The report presents findings and recommendations that will be of interest to teachers, principals, school support services, curriculum developers and policy-makers. I hope that it will inform debate and policy decisions on how we can ensure that young people have the skills, knowledge and attitudes necessary to benefit from the opportunities presented by this powerful technology in the years ahead.



Eamon Stack
Chief Inspector



Executive summary



Executive summary

An evaluation of the infrastructure, planning and use of information and communications technology in teaching and learning was conducted by the Inspectorate in primary and post-primary schools during the school year 2005/06. The objectives of the evaluation were:

- to examine the extent to which ICT was used in primary and post-primary schools
- to evaluate the impact of ICT on teaching and learning
- to assess the ICT skills of students at selected points in the education system and to obtain their views on their experience of ICT in their schooling
- to obtain the views of principals and teachers on their ICT skills and their opinions of the impact and future role of ICT in education
- to make recommendations for policy development regarding ICT in schools.

The evaluation methods comprised:

- a national survey of primary (234) and post-primary (110) principals
- a national survey of primary (1,162) and post-primary (800) teachers
- case-study school evaluations by inspectors (32 primary schools, 20 post-primary schools)
- observations during classroom inspections (77 primary schools)
- observations during subject inspections (111 post-primary schools)
- a follow-up on-line survey of teachers in case-study post-primary schools.

Summary of main findings

The findings and recommendations are summarised here and are elaborated in chapter 7.

Infrastructure

- The student-computer ratio (SCR) in Irish schools is 9.1:1 at primary level and 7:1 at post-primary level. Information available from the OECD suggests that countries that have taken the lead in the provision of ICT in schools are aiming for or achieving a SCR of 5:1.
- In the main, schools make effective use of the grants provided by the DES for developing their ICT systems. However, schools generally spend considerably more on ICT than the sums made available through these grants schemes.
- The lack of technical support and maintenance is a significant impediment to the development of ICT in schools.
- At primary level, computer rooms are generally a feature of the larger schools. However, access by students to computers was found to be superior where the computers were located in the classrooms. At the post-primary level there is a greater permeation of computers in specialist rooms than in general classrooms.
- Schools were found to use a limited range of ICT peripherals, mainly printers, scanners, and digital cameras. Digital projectors were found in post-primary schools. At primary level, interactive whiteboards were present in a small number of schools.
- Schools that made dedicated computer facilities available to teachers reported that it led to the use of more high-quality and creative teaching resources in classrooms.

Planning

- Responsibility for ICT in a school can lie with an ICT steering committee, the principal, the deputy principal, an ICT co-ordinator, or a combination of these personnel. Greater efficiency is achieved where a named person has responsibility for ICT within a school and where their role is clearly defined.
- The majority (71%) of primary schools surveyed, but fewer than half (46%) of post-primary schools, were found to have a written ICT plan. These plans tend to concentrate more on infrastructural issues than on how ICT can be used to enhance teaching and learning.
- Most schools (83% of primary schools, 87% of post-primary schools) were found to have an acceptable-use policy (AUP). This is a product of the requirements of the Schools Broadband Access Programme and the safety-awareness initiatives of the NCTE. It is also an indication of the seriousness that schools attach to the risks associated with the use of the internet.
- The majority of teachers make some use of ICT in lesson planning and preparation. Newly qualified teachers are more likely to use ICT for this purpose than their more experienced colleagues. However, fewer teachers were found to plan for the use of ICT in teaching and learning. At the post-primary level, planning for the use of ICT in teaching varies between subjects. The programmes for Transition Year, LCVP and LCA specifically encourage planning for the use of ICT in teaching and learning. Teachers of these programmes regularly reported that their involvement also encouraged them to use ICT in their teaching with other class groups.
- School principals and teachers identified the provision and maintenance of hardware in schools and the provision of professional development opportunities in ICT as being strategically important for the development of ICT in their school. Generic programmes of professional development, because of their wider appeal, were found to have a greater take-up among teachers than topic-specific programmes.

Teaching and learning

- Only 30% of primary teachers and 25% of post-primary teachers rated their ability as either “intermediate” or “advanced” with regard to using teaching and learning methods that are facilitated by ICT. Recently qualified teachers had a higher perception of their ICT skills than more experienced teachers.
- At the primary level, the inspectors reported evidence of the use of ICT to facilitate teaching and learning in 59% of the classrooms visited. However, the inspectors observed ICT actually being used in only 22% of the lessons observed. Nearly a quarter of all inspections showed a competent or optimal level of performance in relation to the use of ICT in the classroom.

- Where ICT is used in primary classrooms it predominates in core curricular areas, such as English and Mathematics, and in Social, Environmental and Scientific Education (SESE).
- The evaluation found that many fifth-class students in primary schools do not have the competence to complete basic tasks on the computer. While most students reported being able to perform many of the most basic computer tasks, such as turning a computer on and off and opening or saving a file, more than 30% reported that they were not able to print a document or to go on the internet by themselves. Almost half (47%) reported not being able to create a document by themselves. The majority did not know how to create a presentation (72%), use a spreadsheet (86%), or send an attachment with an e-mail message (88%). Competence in the use of ICT is limited for the most part to basic ICT skills, centred on the use of word-processing.
- Only 18% of the post-primary lessons observed by the inspectors involved an ICT-related activity. Students' interaction with the technology was observed in only about a quarter of these instances. The most common ICT-related activity observed was the use of a data projector to make a presentation to a class group. Inspectors judged that effective integration of ICT in teaching and learning was occurring in approximately half of the lessons in which the use of ICT was observed (i.e. in approximately 11% of all lessons observed).
- Dedicated ICT lessons at the post-primary level are more prevalent among first-year classes, and are provided less frequently as students progress towards the Junior Certificate. The majority of schools concentrate on providing students with such lessons in their Transition Year, in the LCVP, and in the LCA.
- High levels of integration of ICT were found at the post-primary level in the science and applied science subjects and in subjects in the social studies I group.¹ Subjects were also identified that rarely made use of ICT, the most notable being Irish.
- The evaluation found that fifth-year students in post-primary schools had the confidence to perform many basic computer operations by themselves, for example saving, printing, deleting, opening and editing a document. However, it also found that they generally needed some assistance to perform more complicated tasks, such as moving files, copying files to external storage devices, and writing and sending e-mail. A relatively low proportion of these students reported being able to create a multimedia presentation. Students required most help with attaching a file to an e-mail message, constructing a web page, or dealing with computer viruses. While the post-primary inspectors generally commented positively on the students' ICT work that they observed, they were also concerned that the tasks undertaken by the students were largely word-processing and presentation tasks.

¹ Social Studies I group includes History; Geography; Art, Craft, and Design; and Music. Social Studies II group includes Religious Education; Physical Education; Civic, Social and Political Education (CSPE); and Social, Personal and Health Education (SPHE).

- ICT is widely used to facilitate the provision by schools of special education. Generally, ICT is used more frequently by members of the special-education team rather than by mainstream class teachers. The emphasis in students' engagement with ICT in special-education settings is mainly on the support of literacy.

Support for ICT

- The level of awareness among teachers of the ICT advisory service is generally low, with fewer than half the respondents at both the primary and the post-primary level reporting an awareness of it. Awareness is higher, however, among ICT co-ordinators than among other teachers.
- The use of the ICT advisory service is also low. At the primary level only 22% of all respondents reported having used the service, while at the post-primary level the corresponding figure was 15%.

Summary of key recommendations for policy-makers and policy advisors

- The level of ICT infrastructure in schools needs to be improved. Specifically, Ireland should be working towards equipping not just all schools but all classrooms with an appropriate level of ICT infrastructure. Consideration should be given to equipping all classrooms with a computer for use by the teacher, broadband internet access with adequate bandwidth, and a fixed data projector and screen for use by the teacher in presentations. Furthermore, to ensure appropriate access to ICT by students, Ireland should strive to reduce its student-computer ratio (SCR) from the present 9.1:1 in primary schools and 7:1 in post-primary schools. International evidence suggests that countries that have taken a lead in this area are aiming for or achieving a ratio of 5:1 or less in all schools.
- Improvements in ICT infrastructure will need to be supported by the introduction of a national ICT technical support and maintenance system for schools. Schools also need to be provided with the capacity to regularly upgrade their own ICT infrastructure.
- The pedagogical dimension of the ICT advisors' role in an education centre could be more appropriately provided by the relevant school support services, in liaison with the ICT school co-ordinators. The technical dimension of the ICT advisors' role could be provided in a number of ways, including for example, by having a commercially supplied ICT maintenance and support for schools. With an effective IT maintenance system in place, the pedagogical role of ICT co-ordinators within schools could be enhanced and supported with appropriate training.

- Support services should give priority to the integration of ICT in teaching and learning. There is an opportunity for such services to work more closely with schools, and with school ICT coordinators in particular, to determine staff training needs and assist in organising appropriate professional development courses for teachers. Support service personnel should aim to be proactive in providing examples of how ICT can be used to facilitate teaching and learning in any programmes provided. Furthermore, course organisers should take greater account of the wide range of ICT abilities and experiences commonly found in groups of teachers and should provide differentiated ICT learning experiences for course participants.
- Additional guidance should be provided to schools and teachers of students with special educational needs so that the needs of learners may be matched more appropriately with the technology available.
- There needs to be an increased emphasis on the application of ICT in teaching and learning in teacher education at pre-service, induction and continuing professional development stages. It is recommended that teacher education departments in third-level colleges should provide student teachers with the skills necessary to effectively use ICT in teaching and foster in them a culture of using ICT in their work. Consideration should also be given to extending and expanding significantly the current range of professional development courses available for teachers. A major focus of such an initiative should be on how ICT may be integrated fully in the teaching and learning of specific subjects and curricular areas. The *ICT Framework for Schools*, which the NCCA will issue in the near future, will be a further assistance to schools in this regard.

Key recommendations for schools

- Schools and teachers should regularly review the use of ICT in their work. In particular, they should strive to ensure greater integration of ICT within teaching and learning activities in classrooms and other settings.
- Teachers should exploit the potential of ICT to develop as wide a range of students' skills as possible, including the higher-order skills of problem-solving, synthesis, analysis, and evaluation.
- Principals should encourage and facilitate suitable ICT training for teachers. Schools should liaise with relevant support services and should endeavour to establish mechanisms to facilitate the sharing of good practice among members of the staff.
- Schools should endeavour to provide all their students with an appropriate and equitable level of experience of ICT at all class levels: at the primary level and at both junior and senior cycle at the post-primary level.

- Schools should plan for the maintenance and upgrading of their ICT systems.
- Computer rooms, where they exist, should be used to maximum effect. Staff members and students should be provided with adequate access to the internet. Post-primary schools in particular should aim to increase the permeation of ICT in general classrooms.
- A designated staff member should be responsible for ICT development. An ICT plan should be developed, using a consultative process, and an appropriate-use policy (AUP) should also be established.
- Teachers should endeavour to integrate ICT more in their planning and preparation for teaching.
- Schools need to ensure that ICT is used to support students with special educational needs in the most effective and appropriate way. Schools need to ensure that they match students' needs to the most appropriate technology available, and that ICT is used to support not only the acquisition of literacy but the widest range of students' needs.
- Schools should exploit the benefits to be had from ICT in their assessment procedures and also in their administrative practices.



Chapter 1

ICT in primary and post-primary education in Ireland

Part 1

Introduction



1.1 Introduction

Information and communications technology (ICT) is an accepted element in all our lives and has a central role to play in education. Since the appearance of the first Government policy on ICT in education in 1997, a substantial investment has been made in ICT facilities and training in Irish schools. In Ireland, as in other countries, the debate about ICT in education concentrates on the potential impact of ICT on teaching and learning and on the measures that need to be adopted to ensure that the potential of ICT to enrich students' learning experience is realised.

This Inspectorate report presents the findings of a major evaluation of the impact of ICT on teaching and learning in both primary and post-primary schools in Ireland. The evaluation set out to establish the extent to which ICT was used in the schools at both levels and, more importantly, to assess the impact ICT had on teaching and learning, including the ways in which ICT is used to facilitate the learning of students with special educational needs. The views of principals and teachers about their own ICT skills, and their opinions about the impact and future role of ICT in education, were sought during the evaluation.

This chapter examines the background to the provision of ICT in Irish schools. It first seeks to place the development of ICT in education in the wider social and economic context. The policy context for the development of ICT in schools is then considered. The findings of the census of ICT

infrastructure (2005) carried out by the National Centre for Technology in Education (NCTE) are then reviewed.

1.2 Background

As the OECD has pointed out, ICT is now ubiquitous in the modern world (OECD, 2001). The OECD has reported that, in the twenty-one OECD countries for which data was available, employment in the ICT industry represented about 6.6% of total business employment (OECD, 2003). This translated into more than 16 million people employed in the industry. The European Union accounted for more than a third of this figure.

The same OECD report noted that average employment growth in the ICT industry over the previous five years had been more than 4.3% annually, a figure that was more than three times that of business in general. A more recent and even more dramatic indicator of the growth in ICT, published by the OECD in 2006, shows an increase in broadband penetration of 33% in the OECD between June 2005 and June 2006 (OECD, 2006b). Similar statistics could be quoted for numerous indicators of the growth in ICT around the world. Such statistics provide irrefutable proof of the extent to which ICT is becoming an increasingly integral part of modern society, with ICT competence becoming increasingly important for effective participation in social and economic activity.

In Ireland, no less than in other OECD countries, the impact of ICT on business and society generally has increased dramatically in recent years. In many respects Ireland has been a leader in the adoption of the technology and in capitalising on its potential to develop our economy. For example, in 2003 Ireland was the leading exporter of computer software, while, according to Eurostat, a third of all personal computers sold in Europe are manufactured in Ireland². However, not all the indicators of progress towards a knowledge economy are as positive. The 2006 OECD report referred to above showed that Ireland was 24th out of 30 OECD countries in broadband penetration. It is clear that, at least in certain areas, Ireland still has some way to go to be a leader in the field of ICT.

The increasing permeation of ICT in all aspects of modern life has led to the concept of a "knowledge-based society," one aspect of which is the knowledge-based economy³. It is now widely accepted that the future prosperity of the country is predicated on our ability to develop a knowledge-based economy. Arising from the Lisbon agenda⁴, the development of such an economy is the stated aim of the Government. The Technology Foresight Reports recommended that the Government establish a major fund to develop Ireland as a centre for world-class research excellence in ICT and biotechnology (Irish Council for Science Technology and Innovation, 1999). As part of its

2 Statistical Office of the European Communities.

3 It [a knowledge-based economy] may be defined as an economy in which the generation and the exploitation of knowledge has come to play the predominant part in the creation of wealth. (Accenture, 2004)

4 The European Council of Heads of State and Governments held in Lisbon in 2000 set as a strategic goal that the European Union should become the world's most competitive and dynamic knowledge-based economy by 2010. The programme of reforms intended to implement this goal is referred to as the Lisbon Agenda or the Lisbon Process.

response, the Government initiated the Technology Foresight Fund of more than €700 million in 2000. Science Foundation Ireland (SFI) was created to administer this fund, first as a sub-group within Forfás⁵ and subsequently on a statutory basis. In its Strategy for Science, Technology and Innovation, 2006–2013, published in June 2006 (p.8), the Government committed itself to building on the achievements of SFI over the previous six years and reiterated its vision for the development of Ireland as a knowledge-based economy (Department of Enterprise Trade and Employment, 2006).

Ireland by 2013 will be internationally renowned for the excellence of its research, and will be to the forefront in generating and using new knowledge for economic and social progress, within an innovation driven culture.

This commitment was reiterated in the current social partnership agreement, *Towards 2016* (Department of the Taoiseach, 2006). In the section on education and training (p.31), one of the specific short-term commitments within the first phase is that “all children will have the opportunity to become ICT literate by completion of second level.” This commitment to the development of ICT underlines an appreciation of the fundamental role played by ICT in a knowledge-based economy.

The critical sector which underpins and enables the transition to a knowledge-based economy is the ICT sector which provides the ability to create, store and distribute knowledge more cheaply than ever in human history. The ICT sector essentially enables the existence and growth of the knowledge-based economy (Accenture, 2004).

The world of education has not been immune to the development of ICT. As Michael Kompf (2005), in a review of a number of books on the subject, notes, “each author assumes ICT as a permanent feature in the landscape of teaching and learning”. The “ICT and education” page of the SURF⁶ web site takes this a step further when it says that

It is no longer possible nowadays to conceive of education without information and communications technology (ICT). One can go even further by pointing out that education is increasingly being defined by ICT.

Much has been achieved in recent years in developing the ICT infrastructure in schools. This infrastructural development has required significant levels of investment, primarily by the State but also by individual schools and institutions. Given the level of investment of both time and finance, as described in this report, the need for a thorough evaluation of the impact of ICT in schools was clear.

As pointed out by the OECD (2001) and others, there are three main rationales for promoting the use of ICT in schools, namely the economic, the social, and the pedagogical. These, of course, are not mutually exclusive. The first two derive directly from the proliferation of ICT in the modern world, referred to earlier. As described above, the economic imperative for promoting ICT in schools is well recognised in Ireland, as it is in other developed countries. The National Competitiveness

5 Forfás is the national policy and advisory board for enterprise, trade, science, technology, and innovation. It operates under the auspices of the Department of Enterprise, Trade and Employment.

6 SURF is the Dutch higher education and research partnership organisation for network services and for information and communications technology.

Council⁷, in its Annual Competitiveness Report for 2006, comments that “better use of ICT has been identified as one of the key factors required to improve Ireland’s productivity performance.” The report went on to point out that, while Ireland’s expenditure per capita on ICT was slightly above the EU 15 average, Ireland ranked ninth of the EU 15 countries in expenditure per capita on ICT.

While funding for research has increased dramatically in recent years, the Expert Group on Future Skills Needs (EGFSN) continues to warn of shortfalls in the output of graduates in ICT. A submission to the Minister for Enterprise, Trade and Employment in October 2005 by the EGFSN and Forfás notes that “existing EGFSN forecasts suggest that there will be significant shortages of graduates with ICT backgrounds in the period up to 2010” (Forfás, 2005).

Though ICT is a vital sector of the economy, requiring highly skilled professionals, it nevertheless represents only a relatively small fraction of total employment. However, in the knowledge economy, as it is now and more so as it will be in the future, ICT competence is a prerequisite for employees in virtually every area. Furthermore, the need for a facility with ICT is not confined to the work environment but increasingly permeates all aspects of everyday life, including home and leisure. The social imperative for promoting ICT in schools, therefore, is clear: if students are to be prepared to lead fulfilled and productive lives in a knowledge-based society they should be ICT-competent on leaving the school system.

The pedagogical rationale for promoting ICT in schools is concerned with the use of ICT in teaching and learning. It is intimately related, therefore, to the economic and social rationales, but ICT also has additional application in the teaching and learning process. It provides teachers with a range of new tools to facilitate traditional pedagogies; it also and perhaps more importantly, presents the teacher with the potential to develop new teaching methods. For the student growing up in a culture of all-pervasive technology, ICT provides new, and more exciting and relevant, learning opportunities.

In 2002 a report by the Information Society Commission (ISC) noted that, compared with major competitors, Ireland lagged some distance in the application of ICT in education (Information Society Commission, 2002).⁸ The report recommended that basic ICT skills should, as far as possible, become a core component of mainstream education. The ISC made a number of recommendations to the Government, including:

- priority for capital investment in ICT in schools
- a commitment to establishing broadband connectivity for schools and other centres of learning
- provision of technical support for the education system
- integration of ICT in the curriculum
- a review of ICT in teacher education, both pre-service and in-service.

⁷ The National Competitiveness Council was established in 1997 as a social partnership body and reports to the Taoiseach on competitiveness issues facing the economy.

⁸ The Information Society Commission was an independent advisory body to the Government, reporting directly to the Taoiseach. The last commission served from November 2001 to December 2004.

Developing an education system responsive to the demands of a knowledge-based society presents challenges for all the participants in education. Not the least of these challenges is the need for significant additional funding to provide the necessary infrastructure to facilitate the development of ICT in the classroom. The technical support and maintenance of this infrastructure, when it exists, is also a challenge and is an issue for many schools (as discussed in later chapters of this report). As noted above, ICT provides teachers with opportunities to develop new teaching methods. However, to realise the potential of ICT to expand their methodological repertoire, most teachers require continuing professional development and support in the use of the relevant technologies. Teachers in specific subject areas also require support in responding to the demands presented by the inclusion of ICT in revised syllabuses. At the school level the integration of ICT in teaching and learning puts additional demands on timetabling as schools expand their curriculum to include dedicated ICT lessons, particularly at the post-primary level, while ensuring equitable access to ICT facilities for students in the context of subject-specific requirements.

1.3 ICT policy and investment in education

The importance of developing ICT in education and responding to the challenges outlined in the previous section has been recognised by the Government for more than a decade. The White Paper on education *Charting Our Education Future* (1995) stated as one of the objectives of the junior cycle curriculum that “all students . . . will have achieved . . . competence and understanding in practical skills, including computer literacy and information technology.” In 1997 the Government published its first policy document on ICT in education, entitled *Schools IT 2000*. The publication of this policy document led in 1998 to the introduction of the ICT in Schools Initiative. This initiative established the basis for the development of ICT in the education system.

1.3.1 Policy for ICT in education

In 1998 the National Centre for Technology in Education (NCTE) was established, with a brief to implement the Schools IT 2000 initiative. The NCTE’s brief also included the development of ICT policy proposals and the provision of ICT policy advice to the Department of Education and Science.

The Schools IT 2000 initiative had three major strands:

- the Technology Integration Initiative
- the Teaching Skills Initiative
- the Schools Support Initiative, including
 - the Schools Integration Project (SIP)
 - Scoilnet.

The role of ICT in supporting children with special educational needs was a feature of all the IT 2000 initiatives.



The Technology Integration Initiative was designed to support schools in developing their ICT infrastructure. Schools received grants for the purchase of computer hardware, and those schools that did not already have an internet connection were assisted in getting on line. (See section 1.3.3.) The aim of the Technology Integration Initiative was to have at least 60,000 computers in schools by the end of 2001. In the following year the NCTE census reported that there were some 84,000 computers in Irish schools.

The Teaching Skills Initiative recognised that there was little point in putting computers in schools unless teachers were trained in their use. This initiative provided for teacher training in three distinct areas, namely ICT skills and awareness, professional skills development in ICT, and pedagogical skills development.

The Schools Integration Project dealt with whole-school development and investigated a range of teaching and learning topics with regard to ICT integration. Approximately ninety pilot projects were established in a number of "lead" schools, which worked in partnership with education centres, businesses, industry, third-level institutions, and the community. Most of the individual projects implemented as part of the SIP concluded in 2001 and 2002, and the remainder were completed in 2004.

The Scoilnet initiative is responsible for the promotion and use of the internet and ICT in education. The main emphasis of this initiative is on the development of the Scoilnet web site (www.scoilnet.ie)

as a resource for teachers and students. Resource materials for the web site are reviewed by a panel of subject experts, thus ensuring their appropriateness for use in Irish classrooms. The Scoilnet web site is the Department of Education and Science's official portal for Irish education. The Scoilnet initiative is also responsible for the development and maintenance of the NCTE web site, which provides comprehensive advice and support on all aspects of ICT in education as well as serving as a notice-board for the NCTE's activities.

Schools IT 2000 envisaged that ICT advisors would be appointed in education centres to support the work of the NCTE by providing leadership, training and support, including on-line support, at the regional level and by providing regular feedback on progress and issues arising. Ultimately some twenty ICT advisors (later increased to twenty-one)—one in each of the full-time education centres—were appointed. The main role of these advisors may be summarised as follows:

- to advise and support teachers in their region in integrating ICT in their teaching and in their students' learning
- to build a knowledge base on all matters relating to the use of ICT in their local schools.

A report on the implementation of Schools IT 2000 published in 2001 revealed a high level of satisfaction with the initiatives implemented under IT 2000 (National Policy Advisory and Development Committee)⁹. The report, however, identified three issues of concern:

- the need for more training for teachers
- the need for more funding (equipment and computers, maintenance, support)
- the need for more support (technical support, encouragement to use ICT).

Based on its findings, the committee made recommendations covering a range of areas, including policy, funding, the professional development of teachers, pre-service teacher education, infrastructure, and technical support.

In 2001 the Government launched its second policy document on ICT in education, *A Blueprint for the Future of ICT in Irish Education*. This was a three-year strategic plan designed to support the continuation of the main initiatives begun under IT 2000 and to build on the progress achieved under that plan. The main objectives of the Blueprint policy were to:

- expand ICT capital provision to schools
- increase access to, and the use of, internet technologies
- further integrate ICT in teaching and learning
- enhance professional development opportunities for teachers.

While support for children with special educational needs was a feature of all earlier initiatives under IT 2000, the Blueprint gave priority to provision for these students. A further focus of the Blueprint was planning for ICT at the school level. Arising from this focus, the NCTE in 2002 published a planning pack entitled *ICT Planning and Advice for Schools*. This pack was designed to facilitate

9 The National Policy Advisory and Development Committee (NPADC) was set up in 1998 under Schools IT 2000 to assist the NCTE in its work. The committee included representation from the education and social partners.

schools in developing ICT plans to meet the infrastructural and other ICT-related needs of their individual schools.

1.3.2 ICT in the curriculum

The revised *Primary School Curriculum* was launched in 1999. The introduction to the 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 (Department of Education and Science, 1999, p. 29).

As this statement suggests, ICT in the primary curriculum is seen primarily as a tool for facilitating teaching and learning throughout the curriculum, rather than as a subject in its own right. The teacher guidelines that accompany the curriculum document for each area provide detailed suggestions on how ICT can be used to best effect in the teaching and learning of the particular subject. Thus, for example, the teacher guidelines for English open the section on ICT with the statement:

Computers and other items of information and communication technologies enrich the teaching and learning of language considerably. The following are among some of the ways in which they may be used.

The guidelines then go on to list some eight ways in which ICT might be used, from CD-based reference materials to the internet and e-mail. In 2004 the National Council for Curriculum and Assessment (NCCA) completed a comprehensive set of guidelines for teachers on the use of ICT (National Council for Curriculum and Assessment, 2004a). These guidelines were designed to complement the teacher guidelines provided with the different subjects in the *Primary School Curriculum* while reflecting developments in ICT since the launch of the curriculum five years earlier. In a discussion document published in the same year the NCCA set out seven key principles for guiding learners' use of ICT (National Council for Curriculum and Assessment, 2004b, pp. 31-34), which adds value to the curriculum when it facilitates:

- students' active involvement in their own learning
- the development of students' higher-order thinking skills
- students' learning in authentic environments
- students' interest and engagement in learning
- differentiated learning for all students
- collaborative learning
- assessment of and for learning.

At the post-primary level, computers were first introduced as a course of study to the curriculum in 1980, when an optional computer studies module was included in the Leaving Certificate

Mathematics syllabus. Schools are required to develop their own syllabus for this option within broad parameters laid down by the DES (Department of Education and Science, 2006). The module is not examinable, but students who complete it satisfactorily are issued with a certificate by the DES. While only minor modifications have been made to the published course parameters since its introduction in 1980, anecdotal evidence suggests that the emphasis in those schools that continue to provide the module has shifted significantly towards the development of skills in such areas as word-processing and spreadsheets.

When the Leaving Certificate computer studies module was introduced in 1980 it was intended that this would be a first step in the development of computer studies in the post-primary curriculum. In 1985 a computer studies course was introduced in the junior cycle. Unlike the senior-cycle module, no certification is provided for those who complete this course. The national survey of school principals reported that only 13% of them were providing this course. (See chapter 6.)

Neither of the computer studies courses has been revised since their introduction, nor has there been any further development of computer studies courses, as such, as part of the curriculum in either the junior or the senior cycle. However, in the LCA programme there are two courses in information and communications technology. All students in the programme must complete a two-module course entitled *Introduction to Information and Communications*. In addition they may choose, as one of their vocational specialisms, a four-module course in information and communications technology. Like all the vocational specialisms, this latter course is assessed in a written examination at the end of year 2. In 2007 this examination was taken by some 1,155 candidates, or 38% of the Leaving Certificate examination candidates who had followed the LCA programme.

While the computer studies modules introduced in the 1980s were seen as independent subjects, with an emphasis on computer programming, more recent trends have concentrated on the cross-curricular applications of ICT. Many of the revised syllabuses introduced in recent years have included references to the relevant applications of ICT in the subject area as well as to the more general applications of ICT to teaching and learning. For example, the teacher guidelines that accompany the revised Junior Certificate Science syllabus, introduced in 2003, have a section on "Using ICT in the teaching and learning of Science." At the Leaving Certificate level one of the stated aims of the Geography syllabus, introduced in 2004, is "to encourage the use of information and communication technology in the teaching and learning of Geography." This syllabus also contains several other references to specific uses of ICT in the teaching and learning of the subject. In the LCVP, in addition to the use of ICT in specific subject areas, students are required to use ICT in the preparation and presentation of their portfolios. In Transition Year, many schools provide courses in ICT-related areas; these include such courses as "Computer Science", "Computer Applications" and "Information Technology".

As part of its work on the place of ICT in the post-primary curriculum, the National Council for Curriculum and Assessment commissioned research in the area. This resulted in two research reports being presented to the NCCA by the University of Limerick. The first study found that there was overwhelming support from both the education system and industry for the introduction of a computer-based subject to the Established Leaving Certificate programme (O'Doherty et al., 2000). The primary reason put forward by respondents for introducing such a subject was the promotion of "computer literacy." The second study investigated the preferred nature of an ICT-related subject in more depth (O'Doherty, et al., 2001). This study reported general agreement on the need to introduce provision for "computer literacy" for all students as the first priority. However, there was no agreement on how best this might be achieved. The findings of the University of Limerick study were discussed at length by NCCA committees. The principal reasons for not proceeding with the development of a discrete Leaving Certificate subject were concerned with the inequalities likely to emanate from such a decision. Committees agreed that equity of access for all students would be compromised, as a discrete subject would, of necessity, be optional.

The NCCA has now adopted a twin-track approach to promoting ICT in the curriculum. Firstly, it aims to facilitate the development of students' competence in using ICT through its inclusion in revised syllabuses and in teacher guidelines. For example, ICT features significantly in the revised Leaving Certificate Design and Communications Graphics syllabus and also in its assessment. It also arises as a focus of learning in the core of the new LC Technology syllabus. Secondly, the NCCA aims to promote ICT as a resource for teaching and learning throughout the curriculum. It is now developing a "Framework for ICT in Curriculum and Assessment" for primary schools and for the junior cycle of post-primary schools. The ICT framework is not designed as a course in ICT but instead is intended to be a cross-curricular support for schools and teachers in developing their students' competence in ICT. It is presented in four inter-related areas of learning, encompassing such attributes as basic knowledge and skills, communication, collaboration, and critical thinking and creativity. The framework is at present being tested in a number of schools, with resources and training being provided. It is hoped to have the framework and support materials ready for use in schools in September 2008.

1.3.3 Investment in ICT in education

Since the introduction of the ICT in Schools Initiative in 1998 the Government has made a substantial investment in the integration of ICT in teaching and learning. As manifested in the NCTE census described later in this chapter, this investment has resulted in significant progress in the development of ICT infrastructure in schools.

Each of the policy initiatives described in the previous section was supported by substantial funding. The details of this funding are summarised in table 1.1.

Table 1.1: Funding of ICT in education policy initiatives

Initiative	Year begun	Funding
Schools IT 2000: A Policy Framework for the New Millennium	1998	€52 million
Blueprint for the Future of ICT in Irish Schools	2001	€78 million
Networking Schools	2004	€23 million ¹⁰
Schools Broadband Programme	2005	€30 million ¹¹

From the 2005/06 school year schools are being provided with broadband internet access as part of a joint project between the Government and the Telecommunications and Internet Federation of the Irish Business and Employers' Confederation. The local schools connectivity is being provided by means of a Schools National Broadband Network. This network and the support services to schools are managed by the National Centre for Technology in Education and supported by HEAnet. The total costs of the Schools Broadband Programme, including the initial set-up and continuing costs to June 2008, are estimated to amount to approximately €30 million.

1.4 ICT infrastructure census in schools (2005)

Beginning in 1998, the NCTE conducted a number of censuses of ICT infrastructure in schools. The most recent of these, the fourth since 1998, was carried out in May and June 2005. The previous census was carried out in 2002. The report of the 2005 census gives a valuable insight into the development of the ICT infrastructure in schools at both primary and post-primary level (Shiel & O'Flaherty, 2006). In so doing it presents an overview of the results of Government investment in ICT while at the same time providing an indication of the need for further investment in the future. The census report provides a comprehensive overview of the ICT infrastructure in schools. The remainder of this section gives a summary of the salient features of the report.

1.4.1 Computers in schools

The NCTE census (2005) shows that since the previous census (2002) there was an increase of approximately 15% in the number of computers in schools. Allowing for schools that did not respond to the census, the total number of working computers in schools was estimated to be 97,709. These were approximately equally divided between primary and post-primary schools. However, as there are almost four-and-a-half times as many primary schools as post-primary schools, the number of computers per school is correspondingly lower at primary level.

The census also collected data on the location of computers in schools. In primary schools and special schools approximately half the computers are in general classrooms. In post-primary schools only 4% of computers are in general classrooms; in those schools almost 60% of computers are in

¹⁰ Expenditure to August 2007.

¹¹ Estimated cost of set-up and continuing costs to June 2008.

computer rooms. Computers at post-primary level were also found in a range of specialist rooms, such as science laboratories and technology rooms. The low penetration of computers in general classrooms at post-primary level was commented on in the evaluation reports provided by inspectors. (This is discussed in chapter 6.)

Rather than the number of computers per school, a more appropriate indicator of the penetration of the technology in schools is the student-computer ratio (SCR).¹² The SCR in 2005 for the three school sectors – primary, post-primary, and special schools – is shown in table 1.2. The table also shows the corresponding figures from the previous two censuses, in 2002 and 2000. It is clear from table 1.2 that there has been a significant improvement in the SCR over the past five years, particularly at primary level. At post-primary level the improvement is less marked, though still significant.

Table 1.2: Student-computer ratio (SCR) in each school sector in given years

	Primary	Post-primary	Special
2005	9.1	7.0	3.1
2002	11.3	7.4	3.8
2000	16.3	10.9	5.7

While the improvement in the SCR is welcome, the ratio is still substantially below international standards. For example, in 2003 the Organisation for Economic Co-operation and Development (OECD) Programme for International Student Assessment (PISA) gathered data on the numbers of computers in schools.¹³ At that time the OECD calculated a SCR for post-primary schools in Ireland of 9:1. This compared with an OECD average of 6:1. The SCR for the United States was 3:1, while for a number of other countries, including Hungary and (South) Korea, it was 4:1. As can be seen from table 1.2, the SCR at post-primary level in Ireland was estimated to be 7:1 in 2005. However, this is still approximately twice what it was two years earlier in the other countries mentioned, and it is likely that those countries will also have shown improvements in the interim.

As noted above, the stock of working computers in schools has increased significantly in recent years. However, this technology is changing rapidly, and what was considered “state of the art” in 2000 is now of limited value for running modern software. The NCTE report shows that in primary schools almost 29% of computers are more than six years old. The corresponding figures for post-primary and special schools are 19% and 21%, respectively. While these computers may be adequate for basic tasks, such as word-processing, they are not capable of running much modern software, and as computers age they become prone to technical problems.

¹² The student-computer ratio (SCR) is the number of students enrolled in a school divided by the number of computers in the school. See note 19 (chapter 2) for further details.

¹³ PISA is administered to fifteen-year-old pupils, and therefore the data refers to post-primary schools.



1.4.2 Other ICT equipment in schools

The NCTE census gathered data on other aspects of schools' ICT infrastructure as well as computers. The most commonly found ICT equipment after the computer was a scanner. This equipment was found in more than 80% of schools across all sectors, with close to 90% of post-primary schools reporting having a scanner. The next most commonly found items of equipment across all sectors were printers and digital (still) cameras. While printers were commonly found across all sectors laser printers were much more common in post-primary schools, with almost 90% of those schools having a laser printer, compared with 38% of primary schools.

Post-primary schools were also better equipped in a number of other areas. Not surprisingly, very few primary or special schools had a data-logger, while almost half the post-primary schools had this equipment. Perhaps more notable is the discrepancy in the availability of data projectors, particularly fixed data projectors, as illustrated in table 1.3. It is also worth noting the low penetration of interactive whiteboards. Only 5% of post-primary schools had an interactive whiteboard, while the corresponding figures for special schools and primary schools were 3% and 2%, respectively.

Table 1.3: Proportion of schools having at least one fixed and one mobile data projector

	Primary schools	Post-primary schools	Special schools
Mobile data projector	31%	78%	28%
Fixed data projector	6%	51%	5%

In relation to special-needs provision, the report shows that, outside of the special schools, there is relatively little provision of assistive technology devices. For example, “other computer control devices (e.g. touch-screens, alternative mice and keyboards)” were reported in only 13% of schools at both primary and post-primary level, compared with 55% of special schools. That such devices are more commonly found in special schools is not, of course, a surprise.

While the NCTE report does show a low penetration of some ICTs relative to other countries, as discussed above, it also shows that, in relation to at least some of the technologies, there have been significant improvements since 2002. For example, the proportion of primary schools that have at least one data projector, either fixed or mobile, more than doubled, from 16.5% in 2002 to 36.4% in 2005. A similar increase was reported in special schools: from 13.3% in 2002 to 30.4% in 2005. The increase in post-primary schools was much less marked, primarily because most of these schools (84%) already had a data projector in 2002. In 2005 some 93% of post-primary schools had a least one data projector.

In contrast to the increasing prevalence of data projectors the change in the adoption of interactive whiteboards has been very slow. This technology was reported in about 2% of primary schools and 5% of post-primary schools in both 2002 and 2005. By contrast, a survey by the Department for Education and Skills in England in 2004 estimated that 63% of primary schools had interactive whiteboards, while the corresponding figure in secondary schools was 92%.

1.4.3 Expenditure on ICT and technical support

As referred to earlier in this chapter, the DES has provided financial support to schools for developing their infrastructure. The NCTE census sought to establish the level of expenditure by schools in addition to grants received from the Department. The response rate to the questions relating to expenditure by schools was relatively low, with the proportion of non-respondents ranging from 20% to 45%. As the report suggests, data on schools' expenditure must therefore be interpreted with caution.

For schools that did respond to the relevant question, the average additional expenditure on ICT in the previous full financial year was €2,129 per school for primary schools, €11,583 for post-primary schools, and €5,679 for special schools.

In relation to technical support, the average amount spent by responding schools was €741 for primary schools, €3,765 for post-primary schools, and €1,239 for special schools. As the report notes, approximately one-third of spending on ICTs was allocated to technical support at primary and post-primary level and about one-fifth in special schools.

1.4.4 Other areas covered in the census

Other areas examined in the NCTE census included networking, ICT planning, the professional development of staff members, the certification of students, technical support and maintenance, and use of the internet.

1.5 Summary

That ICT should be an integral part of the education system is no longer a matter for debate. Students must be provided with the opportunity to develop the competence required to equip them for life in a knowledge-based society, while teachers cannot afford to ignore the potential of ICT for enhancing teaching and learning in their classrooms. Yet achieving an appropriate level of integration of ICT in teaching and learning presents a number of challenges. These range from the provision of the necessary physical resources to issues of curriculum development and assessment and the professional development of teachers. The remainder of this report describes the current stage of development of ICT in primary and post-primary schools. It presents examples of good practice as well as areas of concern and provides a series of recommendations for policy-makers and schools that, if implemented, would serve to enhance the learning experience of the young people in our schools.



Chapter 2

Evaluation methods



2.1 Introduction

The Inspectorate's evaluation on which this report is based took place in both primary and post-primary schools in the school year 2005/06.¹⁴ This chapter begins by looking at different approaches to evaluating ICT in schools and proceeds by giving an overview of the present evaluation. The purpose and aims of the evaluation are explained, and the research methods used are also described. An outline of the reporting procedures that pertained to the evaluations in schools is also given.

2.2 Approaches to evaluating ICT in schools

The pivotal role of ICT in the development of the knowledge economy is widely recognised. As described in chapter 1, there has been substantial investment in ICT in education over the past decade. Ireland, of course, is not unique in this respect: the integration of ICT in teaching and learning has been a feature of education systems in developed countries for many years. Given this level of investment, and the importance of ICT in a modern knowledge society, it is important that the impact of that investment be evaluated to establish the extent to which students' learning and skills are being enhanced.

¹⁴ Special schools were not included as part of the evaluation.

Almost a decade ago Barton (1998) remarked, in relation to Britain, that “despite the massive investment of time and money in information technology it is difficult to get clear evidence of ‘value-added’ in relation to IT use in our schools.” More recently, despite continued high levels of investment, Tearle (2004) noted that, “even today, the regular use of ICT by the majority of staff [members] and students within any one school is not commonplace”. In Britain the Office for Standards in Education, while noting that the importance of ICT as a tool for learning is now widely recognised, pointed out that “the government’s aim for ICT to become embedded in the work of schools is a reality in only a small minority of schools” (Ofsted, 2004).

One type of ICT evaluation that is widely undertaken is the evaluation of the infrastructural development in schools. The NCTE censuses (which are referred to in chapters 1 and 3) are an example of this type of evaluation. This is an essential type of evaluation, and such statistics as the student-computer ratio are a useful indicator of the permeation of ICT in schools. However, it is a mistake to equate the availability of hardware with its productive use. To do so is an example of what Papert (1990) refers to as “technocentric” thinking and raises the question, “What contribution do these computers make to achieving the stated goals of education?”

A different approach was that adopted by the authors of the Impact2 report, who investigated the correlation between the use of computers and attainment in National Tests and General Certificate of Secondary Education (GCSE) results in Britain (Harrison et al., 2003). That research set out to determine whether or not those students who used and were familiar with computers attained better results in national tests than their counterparts who did not.

The most common qualitative approach to assessing the impact of ICT is by observation of teaching and learning in classrooms. This is the approach normally adopted by school inspectorates. The report by the Office for Standards in Education referred to earlier was based mainly on visits to schools by inspectors between April 2002 and December 2003. A similar approach was adopted in the development of school portraits as part of the European Research Network for ICT in Schools of Tomorrow (ERNIST) project, the purpose of which was to identify and disseminate examples of innovative uses of ICT in the classroom. Van Oel (2004) reported that, in addition to observing classroom practice, inspectors examined school planning documents and discussed the issues and their findings with the wider school community.

Haydn (2001) has pointed out that the types of ICT that may add value to a lesson vary from subject to subject. Similarly, some evaluation techniques may have specific applicability. For example, Barton (1997) carried out a study in which he compared the time students spent drawing graphs manually with the time taken using data-logging equipment. This type of comparative study seems attractive, as it appears to have the potential to demonstrate “added value” through the use of ICT.

The present evaluation may be described as a combination of the quantitative and the qualitative.

The combination of the two approaches was designed to provide a more comprehensive overview of the impact of ICT in schools.

2.3 Overview and aims of the evaluation

There has been little published research evidence on the efficacy of ICT initiatives in schools in Ireland, particularly with regard to teaching and its impact on students' learning. This report aims to bridge that gap. The aim of this evaluation was to assess the impact that ICT is having on education in primary and post-primary schools. The evaluation also sought to assess the knowledge, skills, attitudes and beliefs of teachers and students in relation to the use of ICT in the teaching and learning process and in schools in general. The objectives of the evaluation may be summarised as follows:

- to assess the extent of the use of ICT in primary and post-primary schools
- to evaluate the impact of ICT on teaching and learning
- to assess the ICT skills of students at selected points in the education system
- to obtain the views of principals and teachers about their ICT skills and their opinions about the impact and future role of ICT in education
- to assess the extent to which ICT is used to support students with special educational needs
- to make recommendations that will inform the development of Department of Education and Science policy.

The evaluation examined the availability of ICT in schools, the extent to which ICT was being used by teachers to enhance and expand their teaching methods, and the extent to which students used ICT to help them to learn, to obtain access to information, or for communication purposes. Evidence was collected from a number of sources:

- a national survey of primary (234) and post-primary (110) principals that elicited their views on the level and use of ICT in schools
- a national survey of primary (1,162) and post-primary (800) teachers designed to examine their beliefs about the effectiveness of computers and other forms of ICT in contributing to education. The teachers were also asked about their own skill levels in using computers and the degree to which computers were used to support implementation of the curriculum
- visits by inspectors to a sample of case-study primary and post-primary schools to evaluate ICT provision (32 primary schools and 20 post-primary schools)
- a questionnaire for students, administered by the inspectors during their evaluation visits to the case-study schools. The questionnaires asked students about the frequency with which they used computers at home and at school, the extent to which they believed they could perform basic operations with computers, and their expectations about whether their future studies or career would involve significant use of ICT
- the use by inspectors of ICT review schedules during classroom inspections as part of whole-

school evaluation (WSE) at primary level (77 schools) and during subject inspections at post-primary level (111 schools).¹⁵

This report presents analyses of quantitative and qualitative data collected from principals, teachers, students and inspectors at primary and post-primary level. Taken together, this wide range of data sources provided a much richer data set than would have been possible from any one source alone. It also allowed for cross-referencing and the triangulation of evidence.

2.4 National survey of primary and post-primary principals and teachers

During the period October–December 2005 a national postal survey of school principals and teachers was conducted.

2.4.1 Survey sampling methods

A total eligible population of 3,024 primary schools¹⁶ and 711 post-primary schools¹⁷ were identified for participation in the surveys of principals and teachers. On the assumption of a minimum response rate of 40% from each sector a systematic sample of 260 schools was taken from the primary school population with a view to obtaining a statistically valid sample of at least 100 schools, while a sample of 155 schools was taken from the post-primary school population with a view to obtaining a statistically valid sample of at least 50 schools. Both school samples were selected using the following stratifying variables:

- (1) region (North and Dublin North, South-East and Dublin South, West and Mid-West, South, Midlands, and Dublin West)¹⁸
- (2) school size (small, medium, large)
- (3) school type (mixed, all boys, all girls)
- (4) student-computer ratio (low, medium, high, not known)¹⁹
- (5) disadvantaged status.

15 See www.education.ie for information and related publications on whole-school evaluations in primary and post-primary schools and on subject inspections in post-primary schools.

16 There were 3,284 recognised primary schools in Ireland in the 2005/06 school year, but special schools and those schools participating in whole-school evaluations at the time of the postal survey were excluded.

17 There were 735 recognised post-primary schools in Ireland in the 2005/06 school year, but those participating in whole-school evaluations at the time of the postal survey were excluded.

18 North and Dublin North Region (Cos. Cavan, Donegal, Dublin (Fingal), Dublin (North), Leitrim, Louth, Meath, Monaghan, Sligo); South-East and Dublin South Region (Cos. Carlow, Dublin South, Dún Laoghaire and Rathdown, Kildare (North), Kilkenny, Wexford, Wicklow); West and Mid-West Region (Cos. Clare, Galway, Limerick, Mayo, Roscommon, Tipperary (North); South Region (Cos. Cork, Kerry, Tipperary (South), Waterford); Midlands and Dublin West Region (Cos. Dublin (West and South-West), Kildare (South), Laois, Longford, Offaly, Westmeath).

19 The student-computer ratio (SCR) for a school is the total number of students enrolled divided by the number of computers in the school. The median SCR for all primary schools sampled was approximately 9.7 students per computer. Accordingly, a school with fewer than 9.7 students per computer was classified as having a low SCR (more favourable), while a school with more than 9.7 students per computer was classified as having a high SCR. The SCR was obtained from the NCTE census (2005), and a SCR was available for 92 % of all schools sampled. In the case of post-primary schools the median SCR for those sampled was approximately 7.4. Accordingly, a school with fewer than 7.4 students per computer was classified as having a low SCR (more favourable), while a school with more than 7.4 students per computer was classified as having a high SCR. Again, the SCR was obtained from the NCTE census (2005), and a SCR was available for 80 % of all schools sampled.

The populations of primary and post-primary schools were sorted by these variables. For primary schools a systematic random sample of 260 schools was selected by starting at a random point and selecting every *n*th school. The starting point was selected by choosing a number at random from 1 to 3,024. The *n* was determined by dividing the total number of schools by the total sample size, i.e. 3,024 divided by 260. (To increase the likelihood of obtaining a minimum response rate of 40%, an oversample was taken to account for the fact that some schools may not have been able to participate.) The list was subsequently treated as circular, i.e. school 1 followed school 3,024. This was approximately equivalent to selecting a proportionate stratified sample in accordance with the variables described above. The same selection principle was applied to the population of post-primary schools.

2.4.2 Survey research methods

In each of the 260 primary and 155 post-primary schools surveyed the principal received a letter of notification from the Inspectorate stating that their school had been chosen for participation in the postal survey. This letter provided schools with the background to the survey and also stated that survey questionnaires would follow.

Subsequently, each school received one questionnaire for the principal and a number of questionnaires for the teachers. All teachers in primary schools that had eight or fewer teachers were asked to complete a questionnaire; primary schools with more than eight teachers were asked to ensure that one teacher per class group completed a questionnaire.²⁰ For post-primary schools, all teachers in schools with nine or fewer teachers were asked to complete a questionnaire; those schools with more than nine teachers were asked to ensure that one teacher from each subject group completed a questionnaire.²¹

These questionnaires for principals and teachers were developed by a team of inspectors, in collaboration with the NCTE, following a review of relevant literature and an analysis of the content of previous questionnaires. With the assistance of a small number of practising principals and teachers, all questionnaires were piloted before being tested among a larger sample of principals and teachers. This piloting helped to refine the questionnaires and ensured that all questions asked were specific and accurate.

Two weeks after the questionnaires were sent to schools a second mailing was issued to those schools that, at that point, had not returned their questionnaires. This was followed by a series of telephone calls to schools where the response rate among the chosen variables was lower than average.

20 Class groups: junior infants, senior infants, first class, second class, third class, fourth class, fifth class, and sixth class.

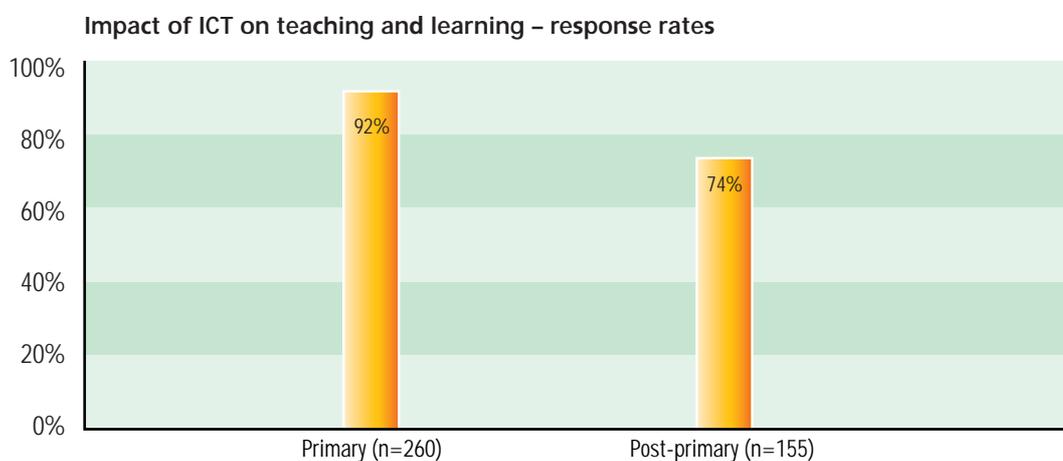
21 Nine subject groups: (1) English; (2) Mathematics; (3) Irish; (4) Foreign Languages; (5) Science (Physics, Chemistry, Physics and Chemistry, Biology, Applied Mathematics, Science); (6) Business Studies (Accountancy, Business, Business Studies, Economics); (7) Applied Science (Engineering and Metalwork, Technical Drawing and Graphics, Construction Studies and Materials Technology (Wood), Agricultural Science, Agricultural Economics, Home Economics); (8) Social Studies I (History, Geography, Art, Craft and Design, Music); (9) Social Studies II (Religious Education, Physical Education, Civic, Social and Political Education (CSPE), Social, Personal and Health Education (SPHE)).



2.4.3 Response rate

Responses were received from 240 (92%) of the 260 primary schools surveyed. Completed questionnaires were received from 234 principals and 1,162 class teachers (an average of almost five teachers per school). At post-primary level, responses were received from 114 (74%) of the 155 schools surveyed. Completed questionnaires were received from a total of 110 principals and 800 teachers (an average of 7 teachers per school). Based on previous experience of similar surveys, the actual response rate in all schools was more than double what was projected. This high response rate reflected the degree of interest in the survey, the perceived importance of the topic, and the follow-up procedure adopted to ensure that replies were received.

Fig. 2.1: Survey response rates



2.4.4 Comparison of respondents and population

The profile of the final sample of primary and post-primary schools was compared with that of the population. This comparison is described in tables 2.1 and 2.2.

Table 2.1: Comparison of survey sample and population, primary schools

Primary Schools		
Size (students)	Respondents²² (n = 240)	Population (n = 3,024)
Small (<100)	52%	53%
Medium (100–199)	24%	23%
Large (200+)	24%	24%
Total	100%	100%
Type	Respondents	Population
Single-sex	17%	17%
Mixed	83%	83%
Total	100%	100%
Status	Respondents	Population
Schools in the School Support Programme (under DEIS) ²³	22%	20%
Schools not in the School Support Programme	78%	80%
Total	100%	100%
Region	Respondents	Population
North and Dublin North	23%	24%
South-East and Dublin South	15%	16%
West and Mid-West	27%	26%
South	19%	19%
Midlands and Dublin West	15%	15%
Total	100%	100%

22 A respondent is defined as a school in respect of which a response was received either from the principal or from at least one teacher.

23 DEIS (Delivering Equality of Opportunity in Schools), the action plan for educational disadvantage, was launched in 2005 and is being introduced in a phased manner over the period 2005–2010. It addresses the educational needs of children and young people from disadvantaged communities, from pre-school to second-level education (age 3–18). The plan provides for a standardised system for identifying levels of disadvantage and a new integrated School Support Programme (SSP). The SSP will bring together, and build upon, a number of existing interventions in schools with a concentrated level of disadvantage. More information on DEIS can be found at www.education.ie.

Table 2.2: Comparison of survey sample and population, post-primary schools

Post-primary schools	Respondents	Population
Size (students)	(n = 114)	(n = 711)
Small (<400)	42%	45%
Medium (400–599)	31%	28%
Large (>600)	28%	27%
Total	100%	100%
Type	Respondents	Population
Single-sex	36%	35%
Mixed	64%	65%
Total	100%	100%
Status	Respondents	Population
Schools in the School Support Programme (under DEIS)	26%	28%
Schools not in the School Support Programme	74%	72%
Total	100%	100%
Region	Respondents	Population
North and Dublin North	19%	19%
South-East and Dublin South	20%	21%
West and Mid-West	21%	20%
South	20%	20%
Midlands and Dublin West	20%	20%
Total	100%	100%

The profile of respondents closely matched that of the population for both primary and post-primary schools according to the key variables of school size, type, status, and region.

2.5 Case-study school evaluations

A case study comprising an evaluation by inspectors of ICT provision in a sample of 32 primary schools and 20 post-primary schools formed part of the evaluation methods employed. These 52 schools were selected as a subset of the main sample chosen for participation in the survey of primary and post-primary principals and teachers. (See section 2.4.) Because the case-study schools were a subset of the main survey sample and were selected randomly (as was the main sample), the case-study schools also reflected the known population profile according to the main stratifying variables. However, it should be borne in mind that the sample size was too small to be considered representative.

Each of the fifty-two case-study schools was visited by an inspector between October 2005 and February 2006. The schools were notified by telephone and letter of their participation in the evaluation two to three weeks before the inspector's visit. The inspectors usually spent one day in each school and undertook the following activities:

- a tour of the school's ICT facilities in the company of either the principal or the ICT co-ordinator
- separate interviews with the principal, the ICT co-ordinator and a small group of teachers, normally four (the principal in each school was asked to select the group to be representative of the range of ICT use in the classroom and to include a teacher involved with special educational needs)
- interviews with a small group of students, usually four (in primary schools the students were from fifth class, while in post-primary schools they were Leaving Certificate year 1 students)
- examination of samples of students' work in, or using, ICT; the students usually took such work with them to their interview with the inspector
- a review of relevant school documents; specifically, schools were asked to supply the inspectors with
 - a copy of the school's ICT plan and acceptable-use policy
 - an inventory of all ICT equipment, including ICT peripherals, in the school, indicating its location in the different classrooms or areas in the school
 - a copy of the duties of the ICT co-ordinator
 - a copy of the timetable for any computer room (or rooms) in the school
- feedback to the principal.

The inspectors used a number of instruments as part of the case-study school evaluations to gather evidence and data on a school's provision of ICT. These included a "quick tour" review schedule that helped to gather certain factual information on the school's ICT infrastructure. Other instruments used included schedules for the interviews held with the principal, the ICT co-ordinator, and the small groups of teachers and students.

The inspectors also reviewed relevant background documents as part of the case-study school visits. Questionnaires for the principal and teachers were received from all fifty-two case-study schools, and these were reviewed as part of the study. Information held by the Department of Education and Science was also consulted (for example information on ICT grants awarded in recent years), as was ICT infrastructure census information (2005) held by the NCTE.

On completion of the school visits a brief report was prepared and issued to each school. These reports addressed the ICT facilities that were found in the schools, as well as ICT planning and ICT in the classroom. As well as emphasising the strengths evident from the evaluation, each report included recommendations for schools to address as part of their development plans for ICT in the school.

During the visits to schools the inspectors also administered a questionnaire to students. The purpose of this questionnaire was to determine the views of students on ICT, not only with regard to their interaction with ICT in school but also with regard to their use of ICT outside school time. For primary schools an entire fifth class was selected for participation, while for post-primary schools an entire Leaving Certificate year 1 class was selected. It was decided to select fifth-class students in primary schools because it was thought that this group would have enough experience of ICT in the school to be able to give informative feedback; this age group was also considered to be mature enough to respond to such formal approaches as interviews and questionnaires. At the post-primary level, Leaving Certificate year 1 students were selected because at that point in their schooling they would have had three or four years' experience of ICT in their school and so were considered to be in a position to give informed responses to questions. A total of 437 primary students and 450 post-primary students completed questionnaires. Reference is made to the findings of this survey of students throughout this report.

2.6 Observations during classroom inspections (primary) and subject inspections (post-primary)

During the period in which case-study schools were being visited by inspectors (October 2005 to February 2006), the majority of the inspectors who were engaged in evaluative work in mainstream primary and post-primary schools completed an "ICT review schedule" for each school they visited.²⁴ These schools were not a subset of the schools that participated in the survey of primary and post-primary principals and teachers but were simply those selected for evaluation as part of the continuing work of the Inspectorate in the period in question. The ICT review schedules used by the inspectors were a means of gathering first-hand information on the use of ICT in those schools, particularly with regard to teaching and learning in the classroom.

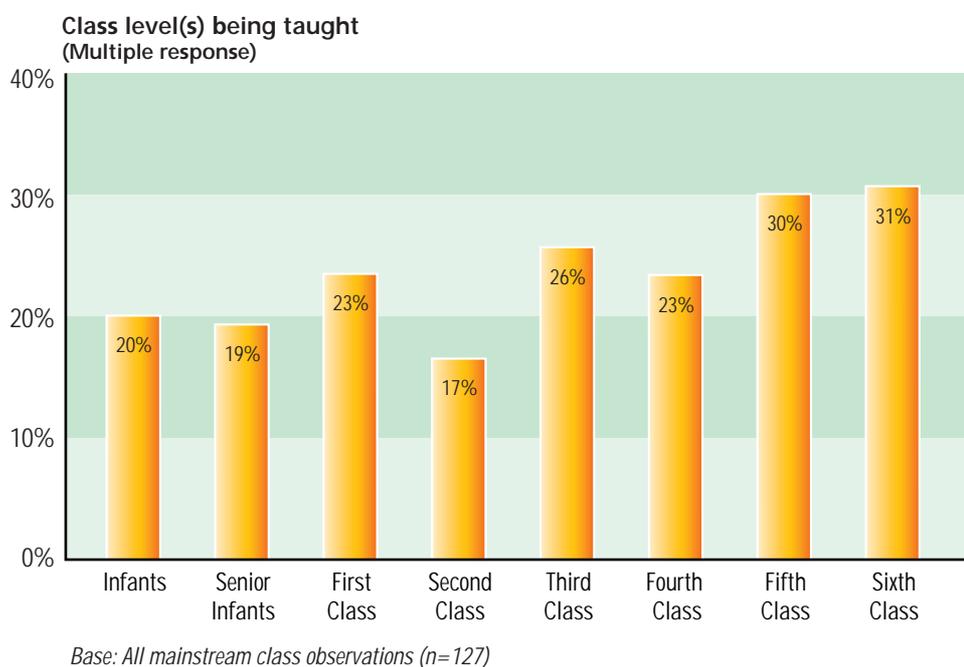
2.6.1 Primary schools

The ICT review schedule used by inspectors at primary level contained three sections. The first two sections were identical and were to be completed in respect of two individual mainstream class teachers. The third section was to be completed in relation to the work of a member of the special-education team in a school (for example the resource teacher, the learning-support teacher or the resource teacher for Travellers). The first part of each of the three sections in the schedule required inspectors to ask questions of the individual teacher relating to their ICT planning and their use of ICT. The second part of each section asked inspectors to observe and evaluate the level of integration of ICT in teaching and learning during the inspection period with that teacher.

²⁴ In the course of their work, inspectors undertake WSEs in both primary and post-primary schools. These evaluations are usually conducted by inspectors working in teams. In addition—and although subject inspections form part of the WSE process in a post-primary school—inspectors also undertake separate subject inspections in post-primary schools.

In all, inspectors visited 77 primary schools during the period in question and completed ICT review schedules in respect of 127 mainstream class teachers. As each schedule was completed during a specific lesson, the inspectors observed 127 lessons. Most of these lessons took place in classrooms with more than one class group (for example, one lesson in a small rural school might have had first, second and third-class students in the same classroom). The classes involved, however, ranged from infants to sixth class. Fig. 2.2 provides details of the lessons observed.

Fig. 2.2: Mainstream lesson observations in primary schools



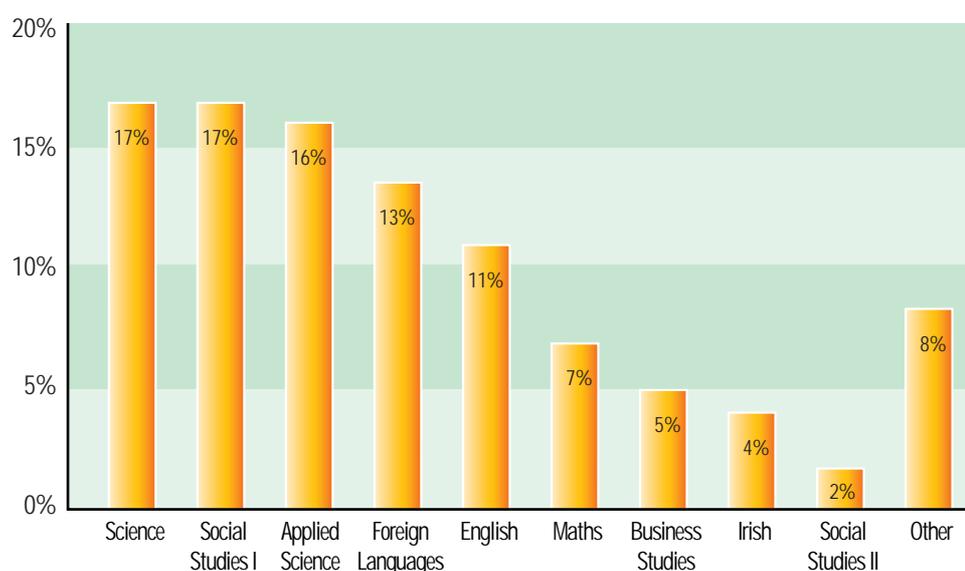
Inspectors completed ICT review schedules in respect of 71 special-education team members (resource teacher, learning-support teacher or resource teacher for Travellers), and therefore 71 lessons conducted by a member of a special-education team were observed.

2.6.2 Post-primary schools

The ICT review schedule used by inspectors at post-primary level was subject-focused and contained two sections. The first section comprised a short subject questionnaire that required the inspector to ask questions of the principal and the teacher (or teachers) of the particular subject (or subjects) being evaluated. These questions related to the use of ICT in the subject (or subjects), ICT in subject planning, and the preparation and implementation of ICT in the assessment of students' achievement. The second section of the review schedule comprised two lesson observation forms and asked inspectors to record the level of integration of ICT in teaching and learning in the subject area being evaluated. Inspectors generally completed one of these forms for a junior-cycle lesson and one for a senior-cycle lesson.

In total, 111 post-primary schools were visited by inspectors during the period in question. This comprised both those schools that participated in WSE and those that participated in a separate subject inspection. This process yielded a total of 168 completed ICT review schedules. In essence, this meant that 168 subject questionnaires were completed jointly by teachers and principals. The subjects reviewed are illustrated in fig. 2.3.²⁵

Fig. 2.3: Subjects reviewed at post-primary level



Base: All post-primary subject questionnaires (n=168)

Arising from the 111 post-primary school visits inspectors completed ICT review schedules in respect of a total of 311 lessons. Table 2.3 gives details of the level of those lessons observed.

Table 2.3: Number and level of lessons observed, post-primary schools

Level	Number of lessons observed	Percentage
Junior Certificate	154	49.5%
Transition Year	38	12.2%
Leaving Certificate	119	38.3%
Total	311	100%

²⁵ In this regard only subjects in which inspections took place are included in the relevant subject groups, as follows: Science (29 subject questionnaires completed for Science, Physics, Chemistry, and Biology); Social Studies I (28 subject questionnaires completed for History, Geography, and Music); Applied Science (27 subject questionnaires completed for Engineering and Metalwork, Technical Drawing and Graphics, Construction Studies and Materials Technology (Wood), and Home Economics); Foreign Languages (22 subject questionnaires completed for French, German, and Classical Studies); English (18 subject questionnaires completed for English); Mathematics (11 subject questionnaires completed for Mathematics); Business Studies (9 subject questionnaires completed for Accountancy, Business, and Business Studies); Irish (7 subject questionnaires completed for Irish); Social Studies II (4 subject questionnaires completed for Physical Education); other (13 subject questionnaires completed for Guidance (8), Transition Year modules (3), and computers (2)).

2.7 On-line evaluation

Twenty post-primary schools, as described in section 2.5, participated in the case studies. In these schools inspectors interviewed a total of 79 teachers. Each of these teachers was subsequently invited to take part in a follow-up on-line survey, which was designed to build a profile of the teachers involved and to obtain further insights into their views on a number of specific issues raised in the interviews. The teachers were asked to complete an on-line questionnaire based primarily on responses obtained in the interviews. A total of 37 teachers completed the questionnaire—a response rate of 47%. The profile of these teachers was compared with that of the random sample of 800 teachers who completed the postal questionnaire. The profiles of the two groups were found to match quite closely on a number of significant variables, namely gender, age, and computer ownership.

2.8 Evaluation outputs and terms

2.8.1 Outputs

All data gathered as a result of the evaluation was analysed using relevant statistical analysis software. Each table and chart in this report presents results using percentages and counts. All percentages are based on valid counts (that is, where questions were answered by respondents, unless otherwise stated). Some rounding of percentages has occurred. The order of outputs in each section generally follows the order of questions in the relevant questionnaires.

2.8.2 Junior and senior classes

At primary level the use of the term “junior class” refers collectively to junior infants, senior infants, first class, and second class; “senior class” refers collectively to third class, fourth class, fifth class, and sixth class. At post-primary level the term “junior cycle” refers collectively to first year, second year, and third year; “senior cycle” refers to Transition Year, fifth year, and sixth year.

2.8.3 Quantitative terms used in this report

A number of quantitative terms are used throughout the report. Table 2.4 provides a guide to the most frequently used terms.

Table 2.4: Quantitative terms used in the report

Quantitative term	Approximate percentage of occurrence
Almost all	More than 90%
Most	75–90%
Majority	50–74%
Less than half	25–49%
A small number	16–24%
A few	Up to 15%



Chapter 3

ICT infrastructure in primary and post-primary schools

Part 2

ICT infrastructure and planning in schools



3.1 Introduction

The effectiveness of ICT in any school is very much dependent on the quality of the infrastructure present. This chapter examines some ICT infrastructural issues in schools. It begins by taking a step back from the school itself to look at the ICT advisory service and in particular the degree to which schools engage with the service. ICT funding issues are also considered, as schools frequently raised the issue of funding during the course of the evaluation. Issues of ICT maintenance, technical support and obsolescence are also examined, as well as the levels of access by teachers and students to computer and e-mail facilities in schools.

The number and location of computers in schools is also examined, and the issues that can arise as a result are addressed. In this regard reference is made to ICT facilities in areas for use by teachers and students as well as ICT in special-education and school administration settings. With regard to the post-primary level, specific reference is made to the dedicated computer room and to ICT in specialist and general classrooms. Finally, the chapter looks at the availability of ICT peripherals in schools, and it concludes by offering some comments on school web sites.

3.2 The ICT advisory service

The ICT advisory service is funded by the NCTE but is managed and implemented by the twenty-one full-time education centres around the country. Its objective is to support the implementation of the ICT in Schools Initiative (see chapter 1) at the local level and to help build a knowledge base on good practice in relation to ICT in schools.

One element of the advisory service is the provision of one full-time ICT advisor, as well as one ICT administrative assistant, in each education centre. The ICT advisors' role is primarily concerned with providing pedagogical advice and support to schools and also (though to a lesser extent) technical advice and support. The activities of ICT advisors are monitored by the NCTE. In the national survey of teachers a number of questions were asked to elicit views on the level and quality of interaction between schools and the advisory service. In addition, the inspectors asked principals, ICT co-ordinators and teachers during all fifty-two case-study school evaluations about the nature of their school's interaction with the advisory service.

In their questionnaire, teachers were asked if they were aware of the ICT advisory service in their local education centre and whether they had availed of it. Fewer than half (48%) of the 1,162 primary teachers reported that they were aware of the service. Awareness among post-primary teachers was even lower, with only 37% of the 800 respondents reporting that they were aware of the service.

The survey found considerable disparity in the awareness levels of teachers (both primary and post-primary) in different parts of the country. Furthermore, at post-primary level it was found that awareness of the service also varied considerably between teachers of different subject areas, with the lowest level of awareness recorded among teachers of applied science subjects.

The survey revealed that 63% of respondent primary teachers were aware that the advisory service offered fully funded ICT courses through local education centres. This figure fell to slightly more than half (52%) of all respondents at post-primary level. At this level teachers of social studies I subjects (History, Geography, Art, Craft and Design and Music) were most aware that such courses were offered, with 57% of these teachers reporting this awareness. This group was followed by teachers of Mathematics (56%), English (55%), and languages (54%). Teachers of Irish (42%) and the applied science subjects (37%) were least aware that the service offered these courses.

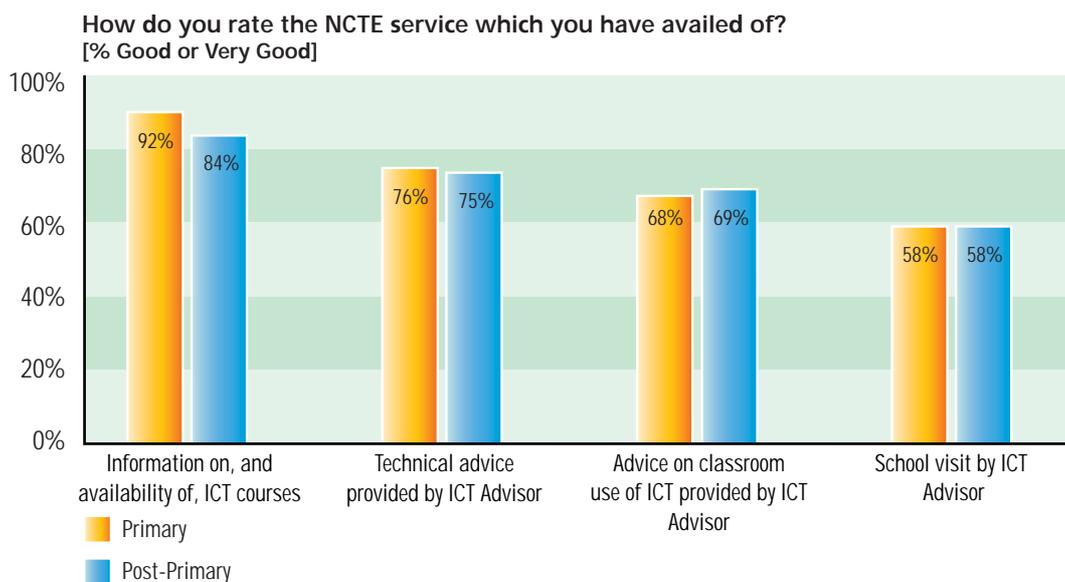
In general, these figures show a substantial variation in levels of awareness among teachers and suggest that there is considerable scope for the service to promote itself more vigorously among schools. In looking at ways to promote an increased level of awareness of the support it offers, the service should consider strategies that are applicable equally to primary and post-primary schools and in all regions. At post-primary level, strategies should be inclusive of all teachers, that is, irrespective of subject expertise.

Of the 48% of primary teachers who reported awareness of the ICT advisory service, some 46% (22% of all primary respondents) reported having ever used it. At post-primary level, of the 37% of teachers who reported awareness of the service only 41% (15% of all respondents at this level) had ever used it. This relatively low level of use among those teachers who were aware of the service may be ascribed to a number of factors:

- insufficient knowledge on the part of teachers of the exact nature of the services offered
- the relatively small number of ICT advisors, making it difficult for teachers to obtain access to the service
- the distance of some teachers or schools from their nearest education centre
- lack of time on the part of teachers to engage with the service.

The survey also asked those teachers who had engaged with the advisory service to rate the service they received. It was found, as shown in fig. 3.1, that "information on, and availability of, ICT courses" achieved high satisfaction ratings, with 92% of primary and 84% of post-primary teachers stating that the quality of the service received was either "good" or "very good." The quality of the "technical advice provided by the ICT advisor" also achieved relatively high satisfaction ratings, with 76% and 75% of primary and post-primary teachers, respectively, reporting this aspect of the service to be "good" or "very good." The "advice offered by the ICT advisor on classroom use of ICT" also achieved respectable ratings, with 68% and 69% of primary and post-primary teachers, respectively, rating this aspect as either "good" or "very good."

Fig. 3.1: Teachers' ratings of NCTE and ICT advisory services



Base: All primary teachers who availed of NCTE/local advisory service (n=239)

All post-primary teachers who availed of NCTE/local advisory service (n=114)

“School visits by the ICT advisor” received lower satisfaction ratings. Some 58% of both the 239 primary and 114 post-primary teachers who reported having availed of this service provided a “good” or “very good” rating. The corollary is that 42% of both primary and post-primary teachers who had received a school visit felt that the service received was either “fair” or “poor.” This finding suggests that the nature of the work undertaken by ICT advisors during school visits should be reviewed, perhaps in collaboration with schools themselves, to ensure that the maximum benefit to the school and teachers results from each visit undertaken.

At post-primary level, teachers of the applied science subjects and the social studies II group of subjects (Religious Education, Physical Education, CSPE, and SPHE) tended to provide more positive ratings for services availed of than teachers of other subjects. Teachers of Business Studies provided the lowest ratings, in particular for technical advice, advice on classroom use of ICT, and the school visit by the ICT advisor. Given this finding, it would be important for the NCTE and the ICT advisory service to ensure that its services at post-primary level take account of the needs of different subject teachers.

The generally low level of awareness of the work of the advisory service was confirmed by the findings from the case-study school evaluations. It was common for inspectors to recommend in reports that the advisory service be made use of as fully as possible. The majority of the nineteen case-study primary school evaluation reports that made reference to the ICT advisory service, for example, encouraged schools to liaise more with the service, and other relevant services, particularly with regard to advice on ICT planning and staff training issues. One of these reports recommended that

support should be sought from relevant bodies—the local education centre, NCTE and the *cuiditheoirí* attached to the primary curriculum support service (PCSP) and school development planning (SDP) to assist the school (i) to provide staff up-skilling in ICT, (ii) to develop a policy on ICT and (iii) to explore ways in which ICT may be integrated in teaching and learning in the school.

Almost half the twenty evaluations conducted at post-primary level made reference to the advisory service, and of those that did, approximately half again commented on the relatively low level of interaction that existed between the school and the service. One inspector commented:

There is a relatively low level of interaction with the ICT advisory service available in the local education centre. This is surprising given the proximity of the school to the education centre. It is recommended that this service be used more extensively.

In one primary-school report it was also mentioned that the “absence of an ICT advisor in the local education centre to support the school and promote ICT projects” was seen as a factor that constrained the development of ICT in the school. This also affected local post-primary schools in a similar fashion.

Notwithstanding the generally low level of engagement by teachers with the advisory service, there were examples of satisfaction with the service in some case-study schools. One primary school report mentioned that the school had

engaged the ICT advisor to assist in the use of the data projector in the school. The school has also engaged in a project through [the local institute of technology] with the assistance of the ICT advisor.

One post-primary school was reported as having a “high level of support from the local ICT advisor in terms of advice and information, particularly in relation to training courses for teachers.” In another post-primary school the reason given for the low level of interaction with the advisory service was that ICT provision in the school had progressed to the point where it was felt that the support of the service was no longer required.

An analysis of the surveys of teachers showed that awareness of the advisory service was considerably higher among ICT co-ordinators than other teachers, and that ICT co-ordinators also tended to avail more often of the service. Table 3.1 shows the differences in the level of use of the NCTE and ICT advisory service services between ICT co-ordinating teachers and other teachers in both primary and post-primary schools.

Table 3.1: Awareness and use of NCTE and ICT advisory services among teachers

	Primary schools			Post-primary schools		
	Teachers who were ICT co-ordinators	Teachers who were not ICT co-ordinators	All respondent teachers	Teachers who were ICT co-ordinators	Teachers who were not ICT co-ordinators	All respondent teachers
Aware of ICT advisory service	81%	45%	48%	84%	31%	37%
Availed of ICT advisory service	63%	18%	22%	61%	11%	15%
Accessed NCTE web site in previous three years	69%	29%	33%	82%	19%	24%
Number of teachers ²⁶	115	938	1,162	46	524	800

The high levels of awareness and strong pattern of liaison with the NCTE and the ICT advisory service among ICT co-ordinators reflects the nature of the work of co-ordinators in schools. This level of communication could be considered an indicator of good practice, and co-ordinators should, where relevant, encourage classroom and subject teachers in their schools to engage with the NCTE and other relevant services.

²⁶ A number of teachers did not state whether or not they were ICT co-ordinators in their school.

3.3 ICT and funding

National investment issues pertaining to ICT in education over recent years are described in chapter 1. An examination of ICT funding issues in individual schools was not a priority of this evaluation: the priorities were more concerned with pedagogical issues. However, schools repeatedly raised the issue of funding during the evaluation, particularly in the case-study school evaluations.

It was clear from the case-study school evaluations that ICT grants received by schools through relevant DES schemes had encouraged schools to install or upgrade their ICT systems.²⁷ In particular, grants had led to improvements in the quality of facilities available in computer rooms, to an expansion in the range of ICT peripherals available, and to the further integration of ICT in teaching and learning. School principals repeatedly acknowledged that these grants had facilitated the development of their ICT systems, and in a small number of evaluation reports specific mention was made of how the grants had been used in developing the school's ICT infrastructure. Where such reference was made inspectors generally noted that effective use had been made of the funds received. One evaluation report commented that "it was clear that these grants have been used effectively to develop the ICT system in the school." It was also obvious from evaluation reports, however, that not all schools had reached the same level of development.

A significant number of primary school evaluation reports mentioned that progress had not been made towards using the grant made available for networking. In a few reports reasons for such delays were cited, such as the school having been approved for a significant building project, while in the remainder no reasons for lack of progress were offered.

While acknowledging the benefits of the grants received, schools generally reported spending more on ICT than they received in grants. Evaluation reports regularly referred to how schools had augmented the financial support received through the NCTE with private funds; a little less than half of the thirty-two primary school evaluation reports, for example, stated that financial assistance for the development of their ICT systems was also received from other sources. This issue (referred to also in chapter 1) was particularly emphasised in case-study schools during interviews with principals and ICT co-ordinators. One post-primary school report commented:

The school is at an advanced stage in the development of ICT for teaching and learning. The facilities are of a high standard and improving. The school's access to private funds plays a large role in the achievements to date, and into the future.

The most frequently reported source of private funds in both primary and post-primary schools was fund-raising by parents' councils or parents' groups. Additionally, at primary level it was also common for students to become involved in fund-raising activities. Primary schools also reported receiving contributions of second-hand ICT equipment from businesses and third-level institutions and of equipment received as prizes in competitions. This additional expenditure on ICT displays a

²⁷ See chapter 1 for details of ICT grant schemes for schools to date, for example, Schools IT 2000 (1998), Blueprint for the Future of ICT in Irish Schools (2001), and Networking Schools (2004). These grants were primarily for the purchase of computers and software for the development of networking, together with the installation of broadband connectivity.

particular commitment by schools to providing students with access to ICT. There is the danger that in relying on private funding sources certain schools may be at a disadvantage. Some students, for example, are likely to be placed at a disadvantage relative to others if their school community does not provide additional funding for its school to purchase computers. The spending of private funds by schools on computers could actually be contributing to an exacerbation of the digital divide in society. Clearly, the widespread use of private funding suggests that the demand for ICT equipment exceeds what can be met from the public grants provided to date.

3.4 ICT maintenance, technical support, and obsolescence

The problems associated with the lack of technical support and maintenance were commented upon strongly in the national survey responses from principals and teachers. These respondents' comments provided an insight into the complexities faced by some schools regarding this issue. One principal of a small primary school stated that "the biggest problem encountered is lack of technical support. We have to take equipment to the nearest IT company for repair." Another primary school principal mentioned that it was "difficult to access maintenance in an isolated rural area, and it's hugely expensive. The DES should provide back-up in each county that we can use." One primary teacher wrote that, while "all multimedia equipment, laptops and the interactive whiteboard have been supplied by the Digital Hub, there should be financial support for its maintenance."²⁸ This comment neatly summarises the fact that for this school the issue was not one of a lack of resources but the lack of an efficient way of maintaining them. At post-primary level, one principal of a small co-educational vocational school (0–399 students) wrote:

All of the IT equipment in the school is old (pre-1999) and is constantly giving trouble. We have no technical expertise amongst the staff so maintenance is a problem. Teachers are discouraged and frustrated and the use of ICT becomes a negative experience for both student and teacher.

All case-study schools consistently reported that the maintenance, upgrading and technical support of their ICT equipment was a cause of great strain, and that these were areas that consumed significant amounts of their budget. A little less than half of the thirty-two primary schools evaluated had made provision for technical support and maintenance of their hardware, while slightly less than half of the twenty post-primary schools visited had a maintenance contract with an external contractor. Arrangements at primary level included responsibility for maintaining the ICT system resting with the principal, with another member of the staff, or with a member of the board of management, or subcontracting maintenance support. Reasons offered by those primary schools that had no ICT maintenance scheme included: the cost; the fact that the ICT infrastructure was so small that its size did not warrant a formal maintenance scheme; and the fact that no member of the staff had the relevant skills or expertise.

²⁸ The Digital Hub is a Government initiative to create an international centre of excellence for knowledge, innovation and creativity concentrated on digital content and technology enterprises. The core development of nine acres is in the Liberties area of Dublin. Over the next decade this initiative hopes to create a mixed-use development consisting of enterprise, residential, retail, learning and civic space. The project is managed by a Government agency, the Digital Hub Development Agency, established in July 2003.



The maintenance contract at post-primary level generally entailed an IT consultant or technician devoting one or two days per month to maintaining the school's ICT system. It was usually the ICT co-ordinator in these schools who was responsible for liaising with the contractor. While not ideal, primarily because of the lack of a same-day call-out service, such contracts did seem to assist these schools in keeping their ICT system intact. In schools that had no contract it was usually the ICT co-ordinator who had responsibility for some, if not all, of the maintenance of the ICT infrastructure.

Schools with no hardware maintenance system stated that this acted as a significant impediment to the development of ICT in their school. Inspectors recommended in these schools that, wherever feasible, an ICT maintenance policy be adopted.

The issue of obsolescence was also found to be a significant problem that schools were required to deal with regularly. One post-primary evaluation report stated:

There is a lot of obsolete or near-obsolete equipment in the school. The laptops seem to be problematic. ICT equipment in the year head and deputy principal's offices are old and largely unused.

Obsolescence appeared to be a bigger problem at primary than at post-primary level. Inspectors made reference to the age of computers in slightly less than half of the thirty-two primary case-study school reports, compared with only a few post-primary reports. In some primary schools it was reported that "most of the desktop computers were dated" or that "some hardware was no longer working." One report mentioned that the "computers in the senior classroom did not appear to be

functioning at the time of evaluation," while in another it was stated that, despite "the considerable investment to date, most of the hardware in the school is quite old." A few reports drew attention to the fact that "some software was incompatible with certain computers" because the hardware was so old.

Taken together, these reports paint a picture of schools having computers that, for all practical purposes, are obsolete and should be disposed of. These findings are supported by the results of the NCTE census (2005), which found that "29% of computers in primary schools, 19% in post-primary and 21% in special schools are over 6 years old." In reports that referred to obsolescence it was sometimes stated that this problem could be reduced if computers were used for tasks compatible with their specification. In cases, however, where the technical specification of computers rendered them unusable, their disposal (in line with proper practice) was usually recommended. The ageing profile of hardware, the lack of compatibility between hardware and software and the development of network systems bring the issue of technical support and maintenance even more to the fore.

In general, schools do not have the expertise within their own staffing to maintain their ICT systems. Where schools have established maintenance contracts with IT companies, on the other hand, this is having a negative impact on their budget and in particular on the level of spending they can afford to devote to computer equipment. One principal of a medium-sized (400–599 students) voluntary secondary single-sex school responded in the questionnaire:

The major problem that occurs in the IT area is the need for ongoing technical assistance. One teacher (part-time staff member) has an allocation of two hours/week but this is only able to service the basic needs of the staff using the rooms and facilities. The school has an IT service provider but this is costly and while good service is given it would be so much more efficient to have a technician on site or at least shared between two schools. The area of technical support must be assessed and supported if we are to progress with increasing use of ICT across the curriculum.

An appropriate increase in the DES student capitation grant paid to schools or direct grants could be used as a means of furnishing schools with an annual ICT upgrading fund. It would be important to make sure that such a budget was reserved for this specific use. The purpose of this budget should be to deal with ICT obsolescence so as to ensure that the ICT infrastructure is not allowed to become outdated. Advice regarding the spending of this annual budget could be sought from the NCTE or other relevant agencies.

It is clear also that the issue of maintenance in schools needs to be addressed in a co-ordinated fashion at system level so that all schools can benefit from having a secure and reliable infrastructure that will support the integration of ICT throughout the school. A strategy is required to ensure that a comprehensive ICT maintenance and support service is available to schools. A range of models whereby this service could be delivered needs to be explored. These models could include clustering schools for the purpose of taking out maintenance contracts with commercial IT companies, national or regional contracts for technical support for schools, or other options. The effectiveness

of these models could be explored on a pilot basis initially, so as to identify the most cost-effective and efficient way in which the necessary support could be provided to schools. These solutions would also require a review of the role and purpose of the local ICT advisory service.

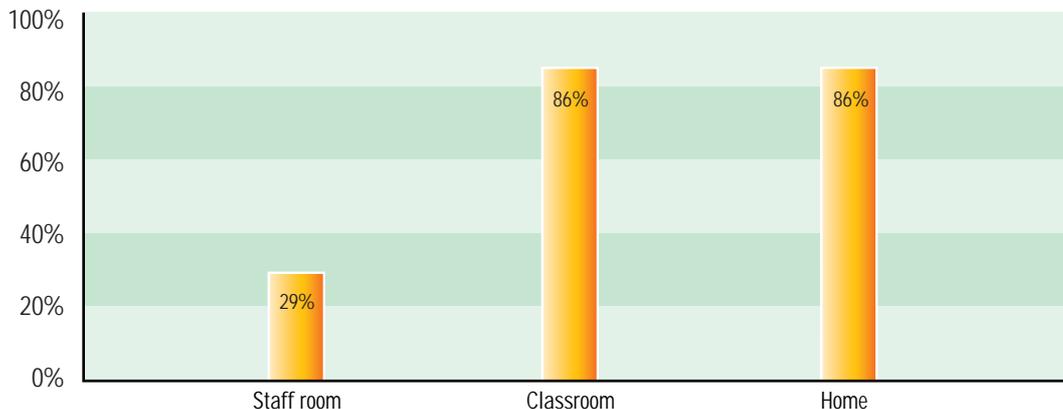
3.5 Access to computers

In general, the surveys of teachers found that schools provided both teachers and students with high levels of access to computer facilities.

3.5.1 Access by teachers

Access by teachers at the primary level, as depicted in fig. 3.2, was primarily provided in the teachers' own classrooms, with 86% of teachers surveyed reporting this to be the case. A similar level reported having access to their own computer at home. A little less than a third (29%) of teachers, however, reported that access was provided in the staff room. This low figure in respect of staff rooms is undoubtedly influenced by the fact that many small primary schools do not have such a room.

Fig. 3.2: Access to computers by primary teachers

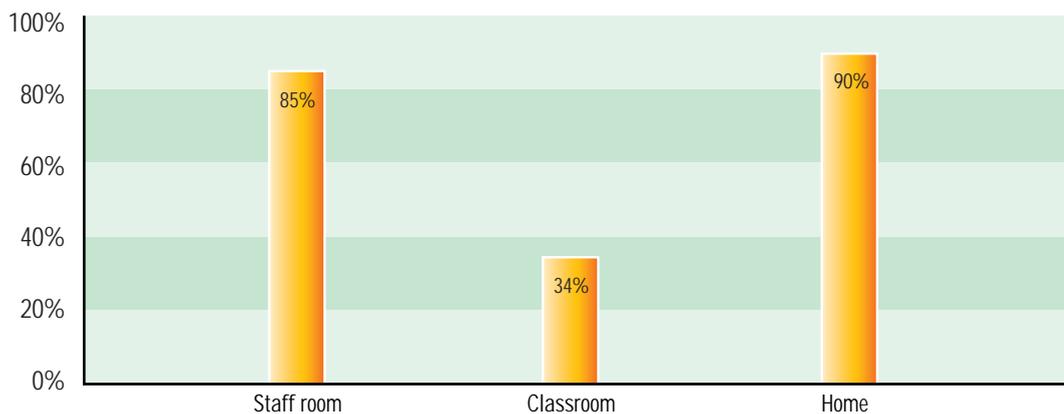


Base: All primary teachers (n=1162)

A little less than a quarter of primary schools (24%) were found to provide their teachers with computer facilities for use at home (for example a laptop computer). Support of this type was found to be slightly higher for teachers of senior classes (29% of senior class teachers) compared with teachers of junior classes (21%). Primary teachers also reported that only 10% of classes had access to their school's computers outside class contact hours.

Access to computer facilities for teachers at post-primary level, as shown in fig. 3.3, was primarily through the staff room (85% of teachers), but a significant proportion (34%) stated that they had access in their classroom. When the findings were analysed by subject it was found that access in classrooms was highest for teachers of the science subjects (66%), the applied science subjects (43%), and Mathematics (41%). Teachers of English (21%), of foreign languages (17%) and of Irish (14%) were least likely to have access in their classroom. It would appear that many schools have opted to give priority to supplying their specialist classrooms with computer equipment, in preference to general classrooms, though the nature of the subjects and the expertise of the teachers may also be explanatory factors.

Fig. 3.3: Access to computers by post-primary teachers



Base: All post-primary teachers (n=800)

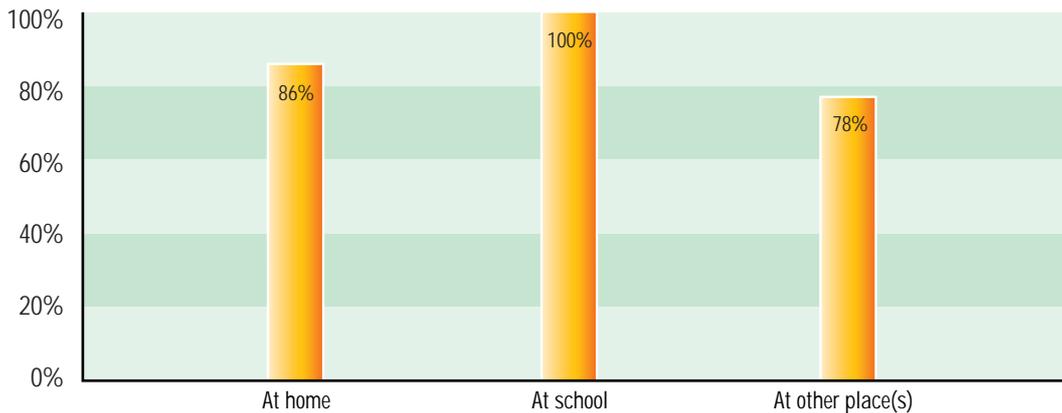
The survey also found that schools with a low SCR were more likely to provide their teachers with access to a computer in their classroom (41%) than schools with a high SCR (30%). It is likely that schools with a high SCR concentrate their ICT equipment in one or more areas in the school (for example the computer room), as opposed to spreading it thinly throughout the school (for example one or two computers in general classrooms). It is also worth noting that 90% of post-primary teachers reported using their own home computer for school activities. Support from their schools, however, was low, with only 18% of teachers provided with computer facilities by their school (for example a laptop for use at home).

3.5.2 Access by students

Fifth-year and fifth-class students in all fifty-two case-study schools that participated in the evaluation (32 primary, 20 post-primary) were also asked about where they had access to a computer. All 437 respondents at primary level, as shown in fig. 3.4, reported having access to

computers at school, but access at home was less, at 86%. Access was also reported from other places, such as a library or a friend's or relative's house.

Fig. 3.4: Access to computers by fifth-class students



Base: All primary students (n=437)

More than three-quarters (79%) of the students surveyed at primary level reported that they had been using computers for three or more years. Their present usage was reported as being frequent: 79% reported using a computer at least two or three times a week at home, while 88% reported using a computer at least two or three times a week at school. Students reported that computers were usually in their classrooms, and that they generally used them individually or in pairs.

More than four out of five primary students (82%) stated that using a computer helped them with their school work. This was mainly through use of the internet for projects. Only 39% reported using their home computer to help them with their homework.

A very high proportion (97%) of the 450 respondent fifth-year students, as shown in fig. 3.5, stated that they had access to a computer at school. A high proportion (89%) also stated that they had access to a computer at home. Outside of school and home there was also access in other places, such as a local library, an internet café, or a friend's house.

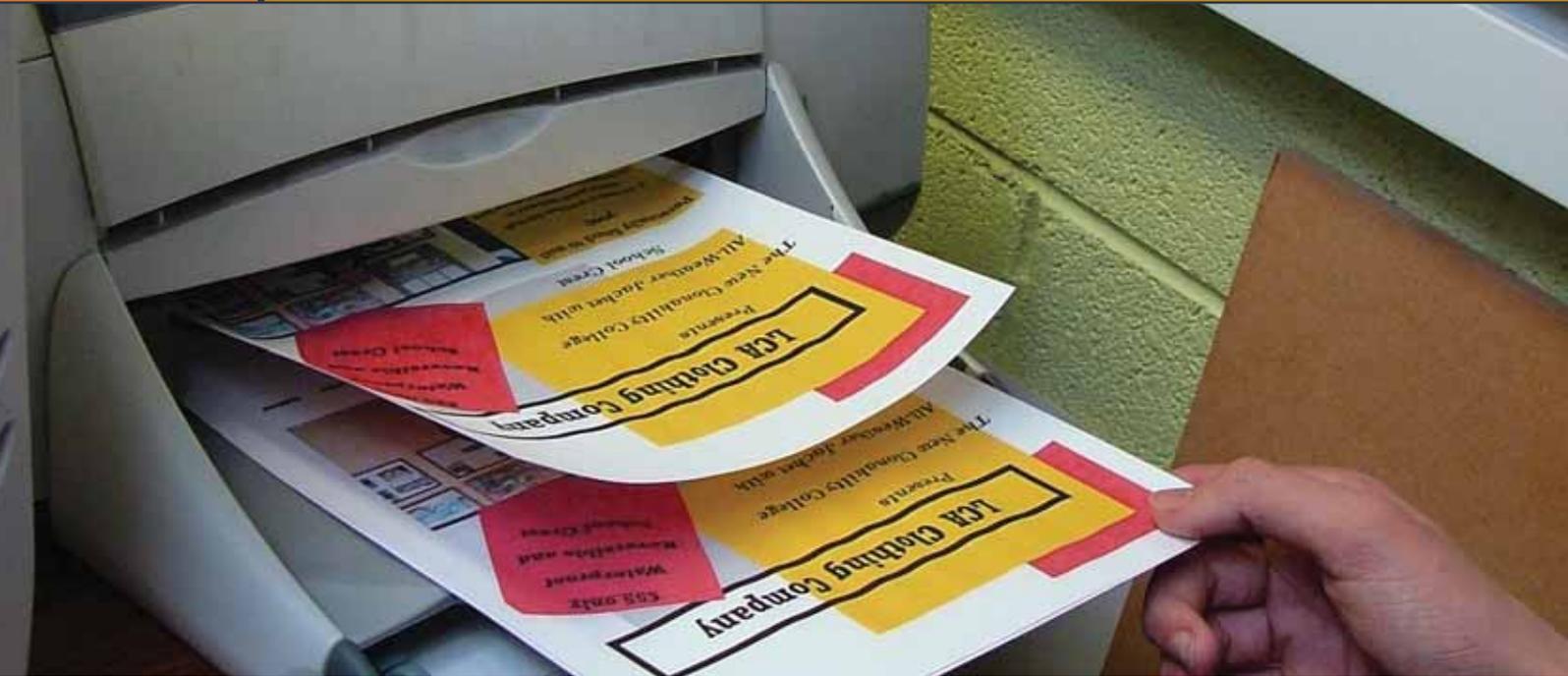
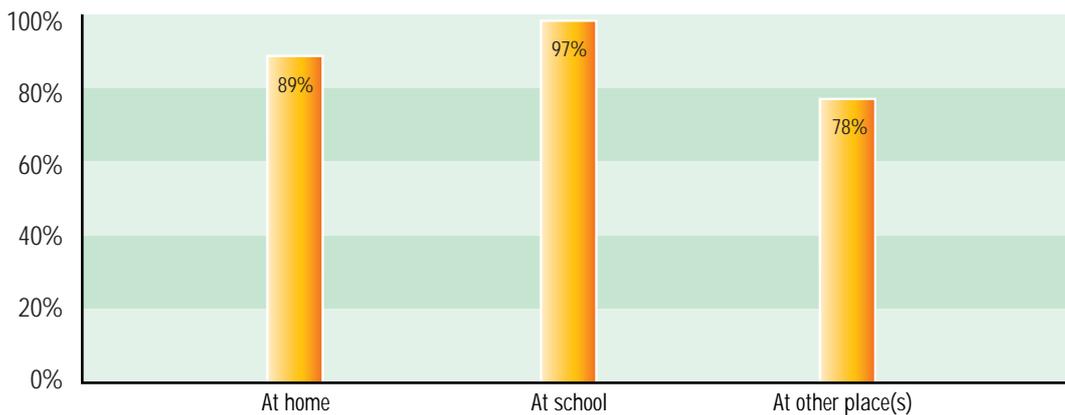


Fig. 3.5: Access to computers by fifth-year students



Base: All post-primary students (n=450)

While it can be said that fifth-year students generally have high levels of access to computers in school, the survey also found that approximately 50% used a computer in school at least once a week. This was slightly lower than computer use at home, where 62% of students reported using a computer at least once a week. Interestingly, the survey also found that students in schools with a high SCR reported using a computer just as often as students in those schools with a low SCR. While this may reflect the fact that computers in post-primary schools are concentrated in computer rooms, it would also suggest that although one school may have more computers than another it does not directly follow that the former put its extra computers to more productive use. Computers in post-primary schools, especially those for the use of students, tend to be located mainly in computer rooms. Students' use of computers, therefore, is more a function of access to a computer room than of access to computers per se. In planning the development of their ICT infrastructure, post-primary schools need to give due consideration to maximising students' access to, and use of, the facilities.

3.6 The use of computers in schools

The survey of principals revealed that 38% of primary schools had at least one computer room and that 62% of schools provided ICT facilities in classrooms only. It also revealed that 10% provided such facilities in computer rooms only, while 28% provided these facilities in both classrooms and computer rooms. At post-primary level, practically all schools have at least one computer room, and traditionally computers in these schools are confined primarily to those rooms. The evaluation found, however, that post-primary schools are increasingly moving towards providing other areas with computer facilities.

Inspectors noted the number of usable computers in each of the case-study schools visited. At primary level this ranged from four computers in one two-teacher school to forty-eight in a 23-teacher school. The SCR for the thirty-two schools visited varied significantly, from an optimum of 2:1 in a small two-teacher school to 16:1 in a five-teacher school. The majority of reports recorded a SCR of between 8:1 and 12:1, with the national average for primary schools in 2005 standing at 9.1:1.²⁹

The number of usable computers in the twenty post-primary schools visited ranged from 124 in one school with an enrolment of 699 students to twenty in a school with an enrolment of 289. The SCR varied significantly among these twenty schools, from an optimum of 3.7:1 in a small community school (fewer than 399 students) to 14.4:1 in a small secondary school. The majority of reports recorded a SCR of between 5.2:1 and 8.4:1, with the national average for post-primary schools in 2005 standing at 7:1.

In planning for the use of ICT in schools, the location of computers is important.³⁰ Sections 3.6.1 and 3.6.2 of this report provide an overview of the organisation of ICT facilities in the case-study schools visited, as well as an overview of the issues that arise as a result. They draw predominantly on information obtained from the case-study schools evaluated but also on the responses to the national surveys of principals.

3.6.1 Organisation of ICT facilities in case-study primary schools

ICT facilities were found in computer rooms, classrooms, staff rooms, administrative areas, school libraries and general-purpose rooms in the case-study primary schools evaluated. The level of permeation of ICT in classrooms was described by inspectors as being "in all classrooms" in twenty-two of the thirty-two schools visited, in the "majority of classrooms" in five schools, in "some classrooms" in one school, and "non-existent" in the classrooms of four schools.

²⁹ See *NCTE 2005 Census on ICT Infrastructure in Schools: Statistical Report* (July 2006), page 3, table 4. The SCR in primary schools for 2000 was 16.3:1, while in 2002 it stood at 11.2:1. As can be seen, there has been an improvement on the SCR in schools between 2000 and 2005.

³⁰ The installation of computers in new schools is governed by the department's technical guidance documents. These are Information and Communications Technology (ICT) Infrastructure Guidelines for Primary Schools (TGD 004), February 2004, and Information and Communications Technology (ICT) Infrastructure Guidelines for Post-primary Schools (TGD 005), February 2004. Both documents can be found at www.education.ie.

ICT facilities in areas for students' use

Eleven of the thirty-two case-study primary schools had one dedicated computer room each. Enrolment in these schools varied between 121 and 624 students. Of the twenty-one schools that did not have a computer room, enrolment varied from 14 to 209 students. Computer rooms, therefore, tended to be found in the larger of the primary schools visited.

The number of computers found in computer rooms varied from a minimum of ten to a maximum of twenty-one networked computers. A few small schools had placed all their computers in a dedicated area, which they referred to as the "computer room." In these cases the number of computers was generally six or less, and usually they were not networked. The reasons for such consolidation of facilities usually concerned lack of space, with one report stating that the "school originally located the computers in the two classrooms, but because of limited space it was decided to relocate them to the staff room." Because of the lack of a suitable area for use as a computer room, one school placed eight networked computers in a mainstream classroom; an ICT specialist teacher directed lessons on these computers while the class teacher taught as normal in the room. In another situation the computer room was used for a range of purposes:

While the timetable facilitates use of the computer room by teachers, there are a number of constraints that adversely affect its use. Among these is the multi-purpose use of the room to accommodate the school secretary, learning-support teaching, resource teaching and the principal's administration duties.

A few schools with a computer room had timetables that generally governed when class groups got to use the room. However, this also governed when other groups did not get to use the room. One report, for example, stated that "a timetable is provided which allows all mainstream classes, apart from infants, at least weekly access to the computer room." In another school it was reported that

students in middle and senior classes leave their classroom in groups to use the computers from time to time. Students in first and second class occasionally use the computers in the afternoon, when the infant students have gone home.

In another report there was clear evidence of restricted use of the computer room:

The computers in the computer room are used by the senior classes only and appear to be in regular use. The other mainstream teachers or students do not generally use the computer room. As there are no computers in either the junior or middle classroom, this means that students do not begin consistent computer use until third class.

With regard to three schools inspectors recommended that the timetable for the computer room be reviewed with a view to providing more students with access. Schools were encouraged to develop a booking system (for example a notice or rota on the notice-board in the staff room) for the use of the computer room whereby teachers could book the room to take class groups at particular times. In their national survey, 51% of principals felt that the main advantage of having a computer room

was that it allowed concurrent access to the computers for whole classes. Interestingly, 32% of principals also felt that it was a more conducive environment for learning ICT than the classroom.

Most case-study primary schools had some level of ICT facilities in each of their classrooms. One report pertaining to a five-teacher school, for example, stated that “there are seven computers shared between mainstream classrooms,” while the report on a thirteen-teacher school noted that there were “over twenty computers in good repair, but of varying age, located in mainstream classrooms.”

In general, the distribution of computers in classrooms varied significantly from school to school. There was no clear pattern as to how schools decided to distribute their computers, as some classrooms had generous levels while others had limited supplies. In schools where computers were located in classrooms only, however, reports did reveal that access to, and use of, the technology was more relaxed and more frequent. One report stated:

Teachers reported that all students had access to, and made use of, computers. This was assisted by the fact that computers are located in each of the classrooms in the school. All students have access to the computer on a weekly basis . . . a computer rota system is used in classrooms to ensure that all students access the computer. Files of individual students' work are maintained on the hard disk of the classroom computers.

In their survey, principals reported that, from a teaching and learning viewpoint, the advantages of having computers in classrooms were threefold:

- there is convenient and flexible access
- it is easier to supervise, control and assist students
- individual attention can be managed more easily, especially for special-needs students.

Computers in classrooms, however, were not always organised optimally. One case-study school report commented:

The organisation of the school's ICT infrastructure, particularly within individual classrooms, should be reviewed to accommodate further development of students' writing skills through the writing process, the development of collaborative skills through project work and the development of research skills through the use of the internet.

The issue of infrastructural layout in primary school classrooms and how it impacts on teaching and learning is explored in greater detail in chapter 5.

From the case-study schools evaluated it seems that while the computer room might be a more efficient way of managing the computers in a school it does not always guarantee regular access to the technology by students. It is also clear that the computer room can sometimes be used for different purposes. It would appear that locating computers in classrooms provides greater access opportunities for students.

Most case-study school reports recorded information about the internet connection that schools were using. Only one report made explicit reference to a working broadband connection. Most of the remainder were connecting with a dial-up system, while in a few instances it was reported that there was no access to the internet at all. In these reports it was stated that the relevant schools were awaiting broadband connection before re-establishing an internet connection.

Internet connection in schools, where it did exist, appeared to be limited to one computer. This restricted students' access, with one report stating that "internet access is strictly reserved for staff [members] or for supervised groups of students." The lack of access to the internet in the classroom was regarded by many teachers as a barrier to the successful integration of ICT in their teaching. As one inspection report stated, "there is currently no internet access in any of the five classrooms which [the] staff identifies as a barrier to the development of the students' ICT skills."

Case-study schools were generally found to have restricted access to the internet. It was regularly recommended in reports that schools upgrade their level of internet access for both students and teachers. It is expected, however, that this situation will improve with the provision of broadband and the networking of computers that was taking place at the time of school visits.

ICT facilities in special-education settings

ICT facilities comprising at least one computer were located in special-education settings in the majority of case-study primary schools. In one school the allocation was particularly good, with two special-education teachers having

the use of three computers together with two printers and two scanners. Two students with specific learning needs have access to individual laptop computers.

Case-study schools regularly acknowledged the benefits that DES grants had in providing dedicated technology for special education needs. A few reports, for example, noted that special-education teachers had access to laptop computers for their work. One report referred to "the learning-support and resource teachers who provide support to the school on a shared teaching basis" having laptops for use in various schools within their cluster. In another report it was noted that "there are also two laptops available which are mainly used by teachers who support students with additional learning needs."

Commercially produced educational software was always used to facilitate teaching and learning in special-education settings. Some schools had "a commendable range of software packages that [were] used regularly to support students," while others had to make do with less. In the latter case the schools were usually advised to expand their level of software resources. (Software issues are discussed further in section 3.8.)

ICT in areas for teachers' use

Fifteen of the thirty-two case-study primary schools had computers available in their staff room that were primarily for use by teachers. The number of such computers ranged from one to five.

While more than half the case-study schools did not provide computers in areas specifically for teachers' use, it is recognised that many of these were small schools that did not have a staff room in the first place. In those schools it was usually reported that the teachers had the use of those computers that were also used by the students (i.e. those in a computer room or in classrooms).

The majority of computers in schools that were specifically designated for teachers' use only were laptops. The learning-support/resource teacher featured prominently in this regard. As will be seen in chapter 4, school management personnel and teachers regularly spoke of how access to such facilities contributed to improvements in the quality of lesson planning, preparation, and content.

ICT in school administration

The NCTE infrastructure census (2005) found that 95% of primary schools used computers for general office use, 60% used the technology for maintaining students' records, and 48% used computers for accounts work. In this evaluation it was found that only fifteen of the thirty-two case-study schools visited reported making use of computers in school administration work. The number of computers devoted to this work was usually one or two. Of the twelve schools that reported devoting two computers to this work, one was usually earmarked for the school secretary, while the other was for the principal. Schools should fully exploit the benefits presented by ICT in school administration.

3.6.2 Organisation of ICT facilities in case-study post-primary schools

A general pattern emerged from the visits made to post-primary case-study schools regarding how they organised their ICT facilities. Each of the twenty schools visited, for example, had at least one computer room.³¹ As already noted (section 3.5), outside of computer rooms schools tended to give priority to supplying computers to specialist classrooms and workshops over general classrooms. The level of permeation of ICT in learning spaces in the case-study post-primary schools was described by inspectors as being "in all classrooms" (both specialist and general) in two schools visited. ICT was found to have permeated the "majority of classrooms" in one school, while it was reported to have permeated "some classrooms" in fifteen schools. ICT was reported to be "non-existent" in the classrooms of two of the twenty schools visited. Computers featured prominently in areas that were dedicated to working with students with special education needs. Facilities were also provided in some schools for the exclusive use of teachers, in staff rooms or other such areas where teachers could undertake planning and preparation work. ICT facilities were also used in school administration areas.

³¹ Eleven schools had one computer room, one school had two computer rooms, five schools had three computer rooms, and three schools had four computer rooms.

The dedicated computer room

The provision in post-primary schools' schedules of accommodation of a dedicated computer room, now often referred to as the multimedia learning laboratory, is a relatively new initiative. Up to 1999 most schools were provided with a room for "commerce or business machines" in their schedules of accommodation. These rooms were generally equipped with typewriters. From 1999 onwards, however, computer rooms were formally provided, though before that many schools had converted existing classrooms to serve as computer rooms.

The computer room is generally used for teaching computer skills to full class groups. The computer room in a new school is generally equipped with seating for up to thirty computer users, with computer hardware being allocated per capita.³² While the total number of computers in the computer rooms of the case-study schools visited varied significantly, the number found was not always in proportion to the school's enrolment. One school with an enrolment of 289 students, for example, was found to have only fifteen computers in its computer room; another, with an enrolment of 397 students, had eighty-eight computers in its computer rooms; a third, with an enrolment of 628, had seventy-six computers; while a fourth, with an enrolment of 699, had ninety computers between its four computer rooms. The average number of computers in the computer rooms of case-study schools was twenty-four. With regard to rooms with an above-average number of computers inspectors usually commented that such schools had a "generously equipped" or "well-equipped" computer room. The proviso was usually added, however, that the equipment was not always up to date.

Inspectors found that most of the case-study schools had availed of DES funding to either create or develop the computer network in their school.³³ It was found, for example, that almost all the schools visited had a network system in their computer room (or rooms), but a few computer rooms also included a number of stand-alone computers. Almost all the network systems installed were wired, though one report referred to a school having a wireless network. While no network was installed in a small number of schools visited, it was reported that those schools had plans to have one installed. Approximately a quarter of the schools visited had two or more networking domains, one usually administrative, the other devoted to use by the students. One school had four networking domains, but the report on this school recommended the consolidation of these networks so that "all computers, with the exception of those used in administration, are on the same network and have access to the internet."

The introduction of the broadband initiative was still in progress at the time of the case-study school visits. In some schools it was reported that broadband access was already available, while others were in the process of acquiring such access. Nevertheless, all the schools visited had some form of internet access. In one school only one computer had internet access, but in all other schools students had access to the internet via the school's computer network. Teachers interviewed reported the internet as being a very valuable teaching resource. In particular, they felt that the

³² See www.education.ie for layouts and specifications for new computer rooms.

³³ See chapter 1 for details of DES grants to schools.

internet allowed for a wide range of digital resources to be brought into the classroom for activities in which the students did their own research or engaged in interactive activities on-line. (This issue is explored in greater detail in chapter 6.)

Almost all the case-study school reports referred to the timetabling arrangements for the computer room (or rooms). Approximately half the reports quantified the time for which computer rooms were timetabled; occupancy ranged from 30% to almost 90%, with the average being slightly more than 60%. In schools where the timetabled occupancy was low it was generally reported that this was to allow teachers to use the room and its facilities as the need arose. However, there was regular mention during interviews with teachers that the practicalities involved in taking a group of students to a computer room tended to discourage them from doing so. Furthermore, a few ICT coordinators spoke of problems that tended to arise when there was unplanned use by teachers of the school's computer room (for example technical problems, breakage, and tampering with systems). For subject teachers to make greater use of computer rooms, school managements would need to ensure that a simple and accessible system exists for booking the room. Such a booking system did not exist in many of the case-study schools visited; approximately a quarter of all evaluation reports referred to the need for some form of booking system to be implemented. It is also important that rules for the computer room are established and that these are regularly brought to the attention of all teachers and students who use the room.

ICT facilities in specialist and general classrooms

While a computer room is normally used for teaching computer skills to an entire class group, computers in specialist or general classrooms are generally intended to support the use of ICT as a teaching aid for subjects. ICT was found in one or more of the specialist rooms in the case-study schools visited. Specialist rooms in which such facilities were commonly found included science laboratories and technology workshops, along with those rooms dedicated to Art, Craft and Design, Music, Geography, Career Guidance and Home Economics. In most reports in which the number of computers in specialist rooms was given it was noted that they contained only one or two computers. In one report, however, it was noted that a science laboratory contained six computers. This level of provision allowed for the potential use of the computers by small groups of students. The more common situation of having a single computer in a room generally meant that it was used either solely by the teacher or in rotation by students, either in pairs or individually. Most school libraries were also equipped with some ICT equipment.

In contrast with specialist rooms, the permeation of computers in general classrooms was found to be more limited. Only two of the twenty case-study schools were found to have computers in all their general classrooms. Of the remaining eighteen schools, each principal generally expressed the view that they would like to see this level of permeation of ICT throughout their school in the years to come. The majority of principals who responded to the questionnaire also expressed this view in the context of their vision for the development of ICT in their school. One principal, for example, identified the following priorities: to increase the incidence of ICT usage by the teaching staff; to

support and up-skill teachers in ICT usage; and to put ICT hardware and software in place in classrooms.

Of these eighteen schools, one was described as having computer facilities in the “majority” of general classrooms, while fifteen had computers in “some” general classrooms. In only two of the schools visited was it reported that there were no computers in any general classrooms. In their evaluation reports it was common for inspectors to recommend an expansion, as resources permitted, of the number of computers made available to general classrooms. A few reports advised schools to consider, as an interim measure, setting up a mobile ICT facility that could be shared between classrooms.

ICT facilities and special needs

The level of provision of ICT equipment in the area of special educational needs varied considerably from school to school at post-primary level. A few reports commented on the high level of provision of ICT for use in this area. One report, for example, commented that “the learning support and resource areas are particularly well catered for,” while another noted that “the learning-support room has twelve laptop computers.” Conversely, one report spoke of the special-education teachers having only “a desktop computer and a printer.” In addition to the availability of computers and peripherals, a few reports also referred to the provision of software in this area. One report referred to the availability of “an extensive library of educational software for use with special needs students,” while another noted that “educational software is confined predominantly to the area of special needs education.” (Further reference is made to the issue of computer software in special education in section 3.8.)

ICT facilities in staff rooms

Schools that made dedicated computer facilities available for teachers’ use reported that it encouraged the teachers to engage with the technology and that it also led to improvements in the quality of the resources used in teaching. The survey of teachers (as mentioned in section 3.5) found that 85% used computers in the staff room for school-related activities. Of the case-study schools visited, approximately a quarter provided one or two computers in the staff room, a quarter provided between three and five computers, while approximately another quarter provided more than ten computers for the use of the staff. In a few schools some or all of the teachers were provided with their own laptops; one school reported that they intended to extend this facility to students. In a few schools it was reported that teachers used computers in the computer room for lesson planning and preparation purposes; and in schools that had computers in classrooms it was reported also that the teachers based in such classrooms generally used these for planning and preparation purposes.

ICT in school administration

Most evaluation reports on case-study schools made reference to the level of ICT equipment in administrative areas. In this regard the inspectors noted the use of ICT equipment in the offices of



school secretaries, of senior and middle school management personnel, and of guidance counsellors and chaplains. It was noted that computers used for administrative purposes were usually on a separate network from those available for academic use. The NCTE infrastructure census (2005) found that 59% of post-primary schools had a separate network for school administration. This is considered good practice, as it affords a higher level of security for sensitive school data.

While not all post-primary schools use computer applications to construct their annual timetables,³⁴ all the case-study schools visited were found to do so. Indeed the majority of case-study schools were also found to use suitable applications to keep detailed information on students; the NCTE infrastructure census (2005) found that 94% of post-primary schools used ICT for this purpose. Schools found this computerisation of students' records to be of particular benefit when liaising with parents on such issues as behaviour, academic progress, and attendance and punctuality, as the school was in a position to obtain accurate information quickly. With regard to attendance and punctuality in particular, a few of the schools that were visited implemented a computerised student attendance system, whereby students were required to check in each morning using their own swipe card. While such a system has certain loopholes, these schools reported that the system had a positive influence on attendance and punctuality patterns.

During interviews a few school principals spoke of the need for appropriate ICT training to be provided for personnel in the efficient use of computers in school administration. The Education Services Initiative (ESI) of the DES should extend schools' use of ICT in its administrative work.³⁵

3.7 ICT peripherals

Teachers were asked in their national surveys what peripherals they used in their teaching and how often they used them. The range of peripherals used and the extent of their use are shown in fig. 3.6 and fig. 3.7 for primary and post-primary schools, respectively.

34 As evidenced by (a) the NCTE infrastructure census (2005), which found that 89 % of post-primary schools used computers to construct their timetables, and (b) the fact that some schools continue to make their October returns to the DES with conventional methods. October returns comprise details of enrolments that schools return to the Department of Education and Science at the beginning of October each year.

35 The purpose of the ESI is to develop a web-based "one-stop shop" portal and specific applications for providing on-line services to schools, replacing paper-based systems. The first application to be developed under this project is the On-Line Claims System. Other services will be developed in a number of phases.

Fig. 3.6: Frequency of use of ICT peripherals by primary teachers

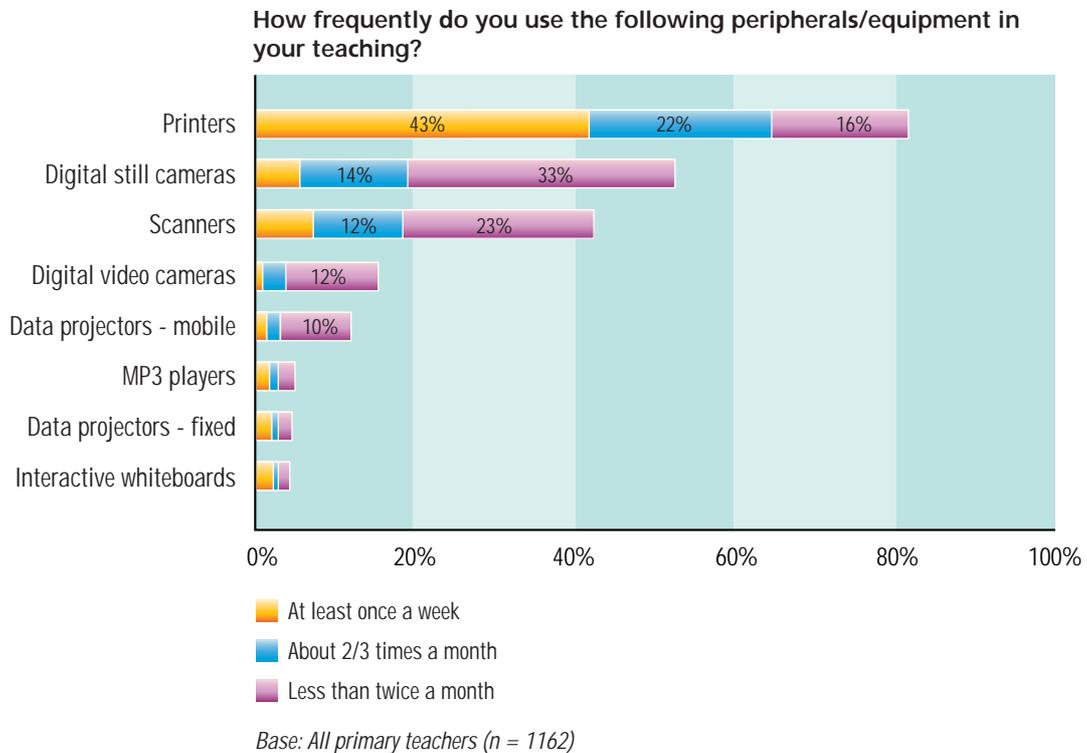
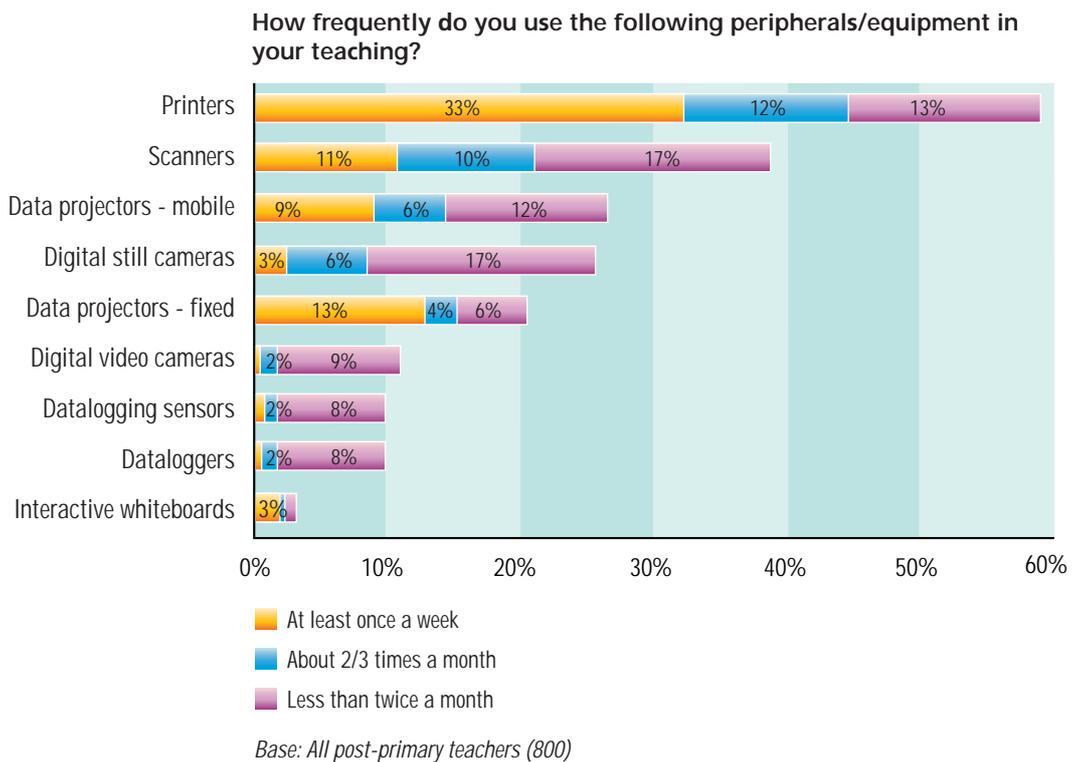


Fig. 3.7: Frequency of use of ICT peripherals by post-primary teachers



Printers were found to be the most commonly used ICT peripherals in both primary and post-primary schools: 65% of primary and 45% of post-primary teachers reported making use of a printer at least two or three times per month. The use of the printer at primary level was higher among teachers of senior classes (72%).

The next most frequently used peripherals at primary level were digital cameras and scanners, both being used at least two or three times a month by 19% of teachers. Again, the use of these peripherals was found to be higher among teachers of senior classes (25%).

Data projectors (fixed or mobile), scanners and digital (still) cameras were the next most commonly used peripherals at post-primary level. When the data was analysed by subject area at post-primary level it was found that a relatively low proportion of teachers of Irish used ICT peripherals in comparison with teachers of Mathematics and the science and applied science subjects. Interactive whiteboards were uncommon in both primary and post-primary schools.

While significant numbers of teachers at both primary and post-primary level use printers, the general use of peripherals is quite low. For example, 19% of primary teachers and 42% of post-primary teachers reported never using a printer in their teaching, while approximately 50% of primary teachers and more than 70% of post-primary teachers reported never using a digital still camera in their teaching.

In the primary case-study schools, printers were also the predominant peripheral. In one five-teacher school in particular there were sixteen printers, while its only other piece of peripheral equipment was a digital camera. The prevalence of printers in primary schools, however, raises questions relating to how schools make decisions concerning the purchase of peripherals, and how they meet their needs while at the same time ensuring that good value is received. It would appear that primary schools in particular need advice regarding the purchase of ICT peripherals. Indeed some evaluation reports made recommendations concerning ICT peripherals. These usually encouraged schools to consider expanding their level of ICT peripherals. Data projectors featured strongly in such recommendations, as they were present in less than a third of the case-study schools visited, almost exclusively the larger schools. Scanners and digital cameras closely followed data projectors.

Post-primary case-study schools reported making regular use of printers and data projectors and, to a lesser extent, scanners, digital cameras, digital camcorders, data-logging equipment, and CD writers. Reference was constantly made during evaluations to one of these peripherals in particular, namely the data projector. Teachers viewed the data projector as a tool that could significantly enhance the teaching and learning process. Many described how the projector could “bring the subject matter to life” through, for example, multimedia presentations (i.e. presentations that include a combination of effects, such as animation, music, and text). It was also regularly described as being a “visually effective tool,” particularly from the students’ viewpoint, because of the larger

screen it facilitates. Finally, the majority of teachers interviewed mentioned that using the data projector also allowed them more time to engage with students, as opposed to having to spend time writing or drawing on the blackboard. In a few schools it was reported that one or more data projectors were mobile, thus facilitating their use by greater numbers of teachers in their own classroom environments.

In more than a quarter of the evaluation reports for post-primary case-study schools the inspectors recommended the purchase, as funds became available, of additional data projectors. In some cases it was recommended that the projectors be mobile, so that they could be moved from classroom to classroom as required, or that a specific room be equipped with a data projector so that teachers could bring their students to that room as required. Such alternative arrangements would be made in accordance with a school's particular circumstances. Given the undoubted benefits of using a data projector to facilitate teaching and learning, it is clear that every classroom should ideally have access to this equipment.

3.8 Software

Teachers in all the case-study schools visited reported making use of software as a teaching aid. The most popular type of software used at primary level was content-rich.³⁶ Exploratory³⁷ and reference software (for example encyclopaedias) were also available, but to a more limited extent. The most popular type at post-primary level was subject-specific software; this was particularly so in the case of special-education teachers (see section 3.6.2). The availability of these types of software, however, varied considerably from school to school.

In general, it was found that only limited areas of the primary school curriculum were supported by software. A few reports from the case-study schools mentioned software being available for particular curricular areas only. The more popular areas supported by software were the Visual Arts, Music, and Social, Environmental and Scientific Education (SESE). In the area of SESE, History and Geography were the more popular areas supported by software. Irish was the least-supported area. Only one school report mentioned that Irish was supported through the use of software, while another mentioned that "a satisfactory range of content-rich software is provided for most areas of the curriculum with the exception of Irish." All reports, however, mentioned that software was regularly used to help develop students' literacy and numeracy skills. It is of interest also that a small number of reports made mention of the lack of software available in schools, despite grants being provided for the purchase of equipment, peripherals, and software.

It was clear that many teachers in both primary and post-primary schools were unaware of the range of software already available to them in their school. Many inspectors recommended, therefore, that schools develop an inventory of the software, and in some cases hardware also,

³⁶ Content-rich software can also be described as tutorial-based software, usually subject-specific and with little or no interactivity.

³⁷ Simulation-type software, usually subject-specific but with a high level of interactivity.

already available in the school. It was further recommended that these inventories be circulated to teachers so as to create a greater awareness of the ICT facilities readily available to them. It was also seen as important that such inventories be regularly updated.

A few reports, particularly for post-primary schools, suggested that a tracking system be developed for the movement of ICT facilities within schools. It is also worth noting that, of the teachers who reported having limited software resources, many admitted to not having submitted a request for such software to their school management. In light of this fact it is recommended that teachers or their subject departments (post-primary) draw up a list of software resources, perhaps annually and in collaboration with their school's ICT co-ordinator, that would be suited to the teaching and learning in their classroom or subject (or subjects). The list should then be submitted to the management of the school for consideration.

During interviews with teachers in case-study schools many of those who were members of their school's special-education team raised the issue of the appropriateness of the match between the equipment and software they used and the needs of their students. Many reported that they lacked an awareness of what support was available and how they could acquire it. This is an area in which the NCTE, in collaboration with the Special Education Support Service (SESS), could assist schools even further, particularly with regard to advising them on the range and type of devices and software available for use with students with special educational needs. There is an opportunity here, perhaps, to disseminate the outcome of such projects as Solas³⁸ and the Laptop Initiative.³⁹

3.9 Use of e-mail

The first NCTE census of ICT infrastructure in schools (2002) found that 16% of teachers in primary schools and 23% in post-primary schools were provided with a personalised e-mail account by their school. By 2005 these figures had risen to 35% and 30%, respectively.⁴⁰ In the national surveys used as part of this evaluation it was found that a little more than a third of teachers in both primary (35%) and post-primary (34%) schools were provided with an e-mail address by their school. At primary level in particular the proportion was higher for male teachers (45%), teachers over thirty-five (45%), teachers in schools with a low SCR (40%), and teachers of senior classes (43%).

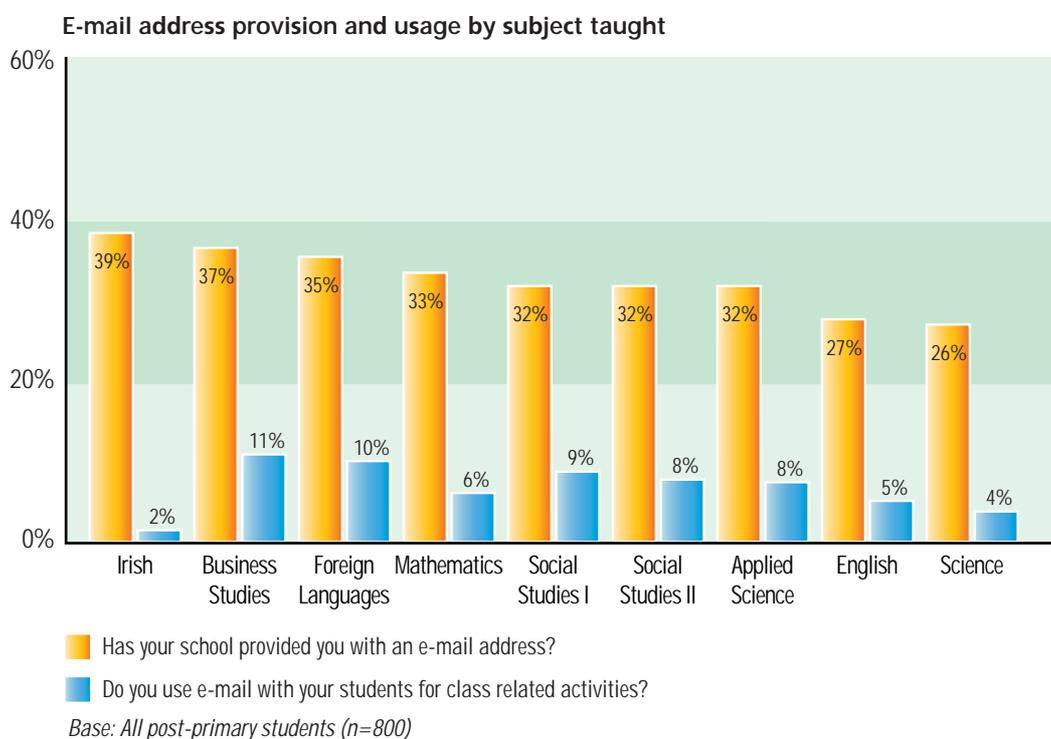
38 SOLAS was an education research project, launched in 1997 and funded by the NCTE, aimed at meeting the special educational needs of pupils with physical and sensory impairments, especially in mainstream education. The project involved the publication of a document entitled *Enabling Technologies: Guidelines for the Use of Assistive Technology in Education*. More information on this project can be found at www.enabletech.ie.

39 This initiative was launched in 2000 and was aimed at identifying how laptop computers could best be used to support second-level pupils with dyslexia or other reading difficulties in inclusive environments. The initiative provided grants for the purchase of laptops for individual pupils and for the purchase of back-up equipment in each of the thirty-one schools involved. Specialist training for teachers involved in the project in these schools was also provided. The initiative was completed in 2005, and a book and CD entitled *Engaging Learners: Mobile Technology, Literacy and Inclusion* were published the following year. Further details on the initiative are available on a special web site, www.laptopsinitiative.ie.

40 See NCTE (2006), *NCTE 2005 Census on ICT Infrastructure in Schools: Statistical Report*.

Despite the level of provision of e-mail for teachers, it was found that considerably fewer reported using e-mail for class-related activities. Only 7% of all teachers at primary level and 8% at post-primary level reported using e-mail with students as part of class-related activities. At primary level, use in class was found to be higher for senior classes (14%) and for male teachers (13%). At post-primary level, when the findings are examined by subject area, as shown in fig. 3.8, some differences become apparent.

Fig. 3.8: Provision and use of e-mail address by subject taught, post-primary schools



The provision of e-mail addresses to post-primary teachers was highest for teachers of Irish (39%), Business Studies (37%) and foreign languages (35%). One reason for this could be that teachers of these subjects, particularly the language and business studies subjects, are likely to be engaged in projects that involve communication with businesses, with other schools, or with teachers in different countries. Interestingly, these categories of teachers did not feature highly among those teachers who had access to computers in their classrooms. A slightly lower proportion of English teachers (27%) and teachers of science subjects (26%) received an e-mail address from their school.

Teachers of Business Studies, foreign languages and subjects in the social studies I group of subjects (History, Geography, Music and Art, Craft and Design) were found to be the best users of e-mail for class-related activities. Teachers of Mathematics, English and Science had a relatively low proportion of e-mail use, while use among teachers of Irish was lowest. In general, it can be said that the provision of e-mail is not always synonymous with its use.

Not surprisingly, the survey found a correlation between use in class and the provision of an e-mail address by a school. At primary level, 11% of teachers in schools that provided their teachers with an e-mail address used e-mail with their students, compared with 7% nationally; at post-primary level the corresponding figures were 13% and 8%. Given the fact (as noted earlier) that slightly more than a third of teachers at both levels are provided with e-mail addresses by their schools, it is clear that many teachers are using their own e-mail address with their students. However, when schools provide this facility for their teachers its use is greatly increased.

Teachers who used e-mail reported that it presented opportunities to communicate with other teachers and schools, with parents, with industry, and with the local community. It provided opportunities to enhance teaching and learning. Popular examples of the use of e-mail at both primary and post-primary level included e-mailing other students as part of school twinning projects and requesting information from companies or agencies for research purposes. Communication with companies regarding work experience was also popular at post-primary level.

The provision of a dedicated e-mail service to schools and their teaching staff should be given priority within the introduction of the NCTE-managed Schools Broadband Access Programme. With regard to those schools and teachers who are already provided with such a facility, efforts could perhaps be directed towards encouraging its use as part of classroom practice.

3.10 The on-line environment

3.10.1 The learning platform

While it is known that some schools make use of their own on-line learning platform, the evaluation found no evidence of such platforms being used in any of the case-study schools visited. Learning platform is an umbrella term that describes a broad range of ICT systems used to provide and support learning and teaching. It usually combines several functions, such as organising, mapping and implementing curriculum activities, as well as providing a facility for teachers and students to have a dialogue about these activities, all by means of ICT. The term is sometimes applied to a virtual learning environment (VLE)⁴¹ or to the components of a managed learning environment (MLE).⁴²

Learning platforms give every student access to personal on-line web space, where they can do such things as store work and record their achievements. They also give every teacher access to teaching resources and tools to support lesson planning and teaching and learning. They also facilitate “personalised learning” by enabling teachers to tailor the curriculum to the needs of individual students. The experience of a learning platform can vary from school to school. However, where

41 A VLE is a software tool that brings together resources for curriculum mapping, implementation, assessment, tutor support, communication, and tracking.

42 A managed learning environment (MLE) comprises the whole range of information systems and processes that facilitate learning and the management of learning within an institution. It includes VLEs or other learning platforms and administrative and other support systems.

there is a strong determination to embed the platform in the working practices of a school, the benefits for teachers, students and parents can be impressive. An effective learning platform can also support school management and administration.

Benefits of learning platforms for teachers

An effective learning platform can enable teachers to

- create and share teaching materials that can be accessed on line, printed out, or used with an interactive whiteboard or data projector
- put their resources on line page by page, lesson plan by lesson plan, so that colleagues can access them both in school and from home, thus facilitating collaboration within their subject area
- obtain access to a wide variety of learning materials that they can customise for the exact needs of their students
- obtain access to lesson plans from colleagues to facilitate cover for teacher substitution
- assess, monitor and track individual and group progress
- receive submissions of work from students in one area that is easy to manage
- manage, within personal desktop space, their timetables, diary, e-mail, and discussions
- increase their ICT competence and confidence.

Benefits of learning platforms for students

An effective learning platform can enable students to

- obtain access to learning materials created by their teachers and others, outside lesson time and from locations such as their local library or home
- store their work and notes on line for use in assignments, homework and revision, outside normal school hours
- work at their own pace and with a wider choice of learning styles, through a more personalised curriculum
- create an on-line portfolio, including digital photographs and videos of performance, as well as text
- improve their ICT skills and on-line management of materials
- submit homework and assignments for marking and assessment
- communicate by e-mail and participate in live discussions and forums with other students and with teachers.

Benefits of learning platforms for parents

An effective learning platform can enable parents to

- play a greater part in their child's learning, where they have access to the learning platform from home
- support children in learning that takes place outside school
- obtain access to their child's personal home page to keep track of their work and the curriculum

- view reports, attendance data, and scores in assessment activities
- communicate effectively with teachers, school administrators and others supporting their child's learning
- engage with wider school issues through on-line communication tools
- become active partners with the school.

Benefits of learning platforms for administration and management

An effective learning platform can

- provide up-to-date management information on attendance and attainment
- track the progress of individuals and groups of students
- collate summative and formative assessments
- reduce the administrative burden on teachers by using transferable data
- enable communication within school and beyond, one to one, one to many, or many to many
- increase communication with parents.

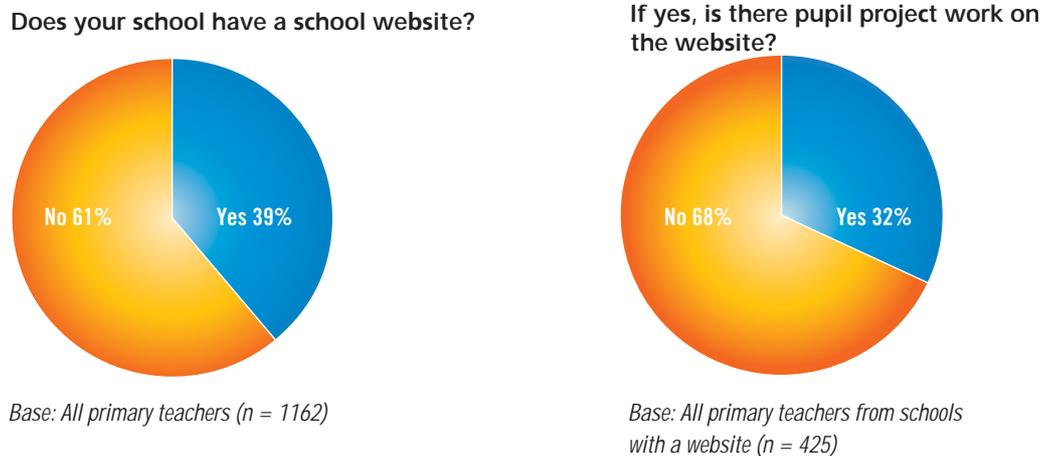
When they are implemented effectively it is clear that learning platforms can have many benefits for schools, including “any time, anywhere” learning, greater parental involvement, the development of personalised learning, better use of teachers’ time, enhanced effectiveness of substitution teachers, collaboration, cross-institutional working, and increased inclusion of students in both their school and personal work. The school of the future will in all likelihood be operating its own learning platform; indeed some schools are already operating such systems, while others are experimenting with the technology. It is recommended that schools that have effectively implemented their own learning platforms be identified as models of good practice for other schools. The NCTE could play a role in identifying such schools and in disseminating their practices and experiences among other schools.

3.10.2 The school web site

Schools with their own web site regard it as a means of informing the public about their school and as a way of promoting the work done in their school. Some websites contain information on initiatives and projects that the school is involved in, as well as examples of students’ work.

The national surveys of teachers asked respondents to state whether their school had a web site and, if so, whether there were examples of students’ work displayed on it. Fig. 3.9 and fig. 3.10 give details of the responses received from primary and post-primary teachers, respectively.

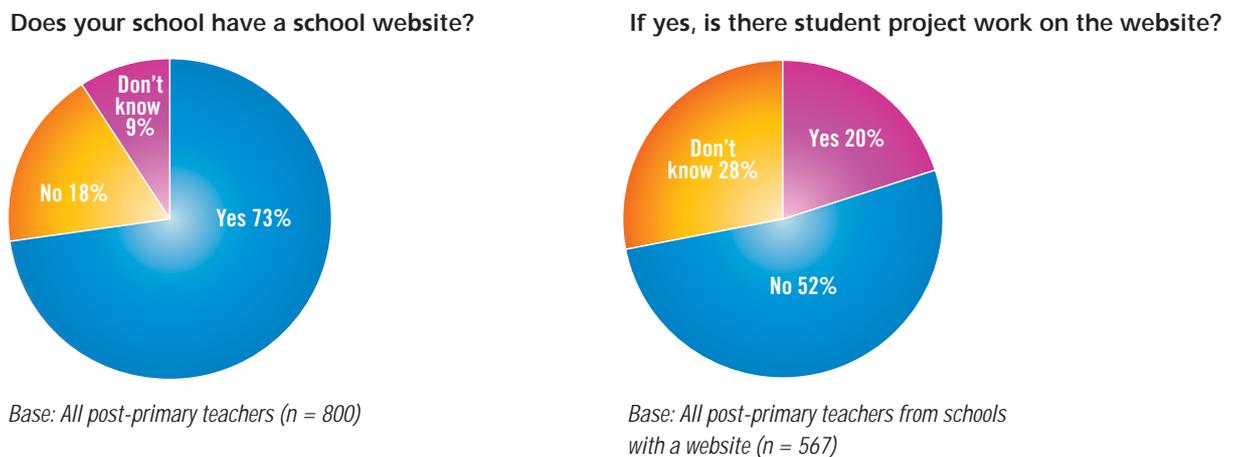
Fig. 3.9: The primary school web site: teachers' responses



Approximately 39% of primary teachers stated that their school had a web site, and of these approximately a third (32%) stated that their site contained reference to, or details of, work done by students. A higher proportion of teachers of senior classes stated that their web site contained reference to work done by their students (41% of teachers of senior classes, compared with 29% of teachers of junior classes).

The survey of fifth-class students found that 41% did not know whether their school had a web site (even though approximately a quarter of these students were in schools that did have one). Of those who were aware (37%), only 20% said that their work had appeared on the site. A much higher proportion of girls (32%) stated that their work had appeared on their school web site than boys (11%).

Fig. 3.10: The post-primary school web site: teachers' responses





Nearly three-quarters (73%) of all post-primary teachers stated that their school had a web site. Of those who did, however, only 20% reported that their site contained a reference to, or details of, project work or other work done by students. A similar pattern of findings emerged from the survey of fifth-year students. Approximately 30% of students did not know whether their school had a web site (approximately half of these students were in schools that did have a web site). Of those who were aware that their school had a web site, only 36% had had the opportunity to contribute to it.

While an awareness of security issues associated with the internet must be borne in mind, these findings are disappointing. Firstly, a considerable proportion of schools do not have their own web site. Secondly, a sizable portion of those schools that do have a web site do not seem to actively promote it. Finally, some schools are opting, either consciously or unconsciously, not to present students' work or other work done in their school. This is surprising in an age when many people automatically resort to the internet when looking for information on schools.

While numerous evaluation reports on case-study schools referred to the desirability of a school either establishing its own web site or developing the use of its existing site, it was also clear that, of those schools that already had one, many experienced difficulties in both developing and maintaining the site. Difficulties encountered at both primary and post-primary level included a lack of technical expertise among staff members. At post-primary level it was usually the ICT co-

ordinator who was responsible for maintaining the site, and for those co-ordinators who were not ICT experts this task proved difficult and sometimes even frustrating. Even those co-ordinators who were comfortable with web site development reported difficulties in finding the time to devote to such work. In a few schools it was found that some senior students were responsible for setting up and maintaining the site. In those schools it was reported that this encouraged students in general to contribute to the site. Security issues with the internet also proved a problem, particularly at primary level.

Despite the provision by the NCTE of dedicated support for schools for web site development, it would appear that most schools remain in need of advice, guidance or assistance regarding the setting up and maintenance of a web site. The NCTE should explore options for providing additional support to schools in relation to web site development.

3.11 Summary of findings and recommendations

3.11.1 Main findings

Funding issues

- The student-computer ratio (SCR) for the majority of the thirty-two case study primary schools visited ranged from between 8:1 and 12:1. At post primary level, the SCR for the majority of the twenty schools visited ranged from between 5.2:1 and 8.4:1. These ratios were broadly in line with the findings of the NCTE census (2005) of ICT in schools which found a SCR in primary schools of 9.1:1 and 7:1 in post-primary schools.
- DES grants make possible a significant improvement in schools' ICT facilities, but they are frequently augmented by funding from other sources. Parents' councils and other parents' groups usually play a significant role here. The spending of private funds on computers, however, may contribute to an exacerbation of the digital divide, as some schools may be able to raise more private funds than others.
- The lack of technical support and maintenance was found to be a major impediment to the development of ICT by schools. Furthermore, a number of schools have equipment that is obsolete and should be disposed of.

ICT advisory service

- The impact of the present ICT advisory service is limited. While it is acknowledged that levels of awareness of the service among teachers varied, awareness is generally low among both primary (48%) and post-primary (37%) teachers. Awareness was much higher, however, among ICT co-ordinators.

- The use of the ICT advisory service was also found to be low. Of the 48% of teachers who reported awareness of the service at primary level only 46% (or 22% of all respondents) reported availing of it. At post-primary level this figure fell to 15% of all respondents.
- There was high satisfaction with the information on, and availability of, ICT courses among those teachers who availed of the ICT advisory service. There were also high levels of satisfaction with the quality of the technical advice and the advice provided on classroom use of ICT.
- A somewhat lower satisfaction rating, however, was associated with the quality of the school visits by the ICT advisor. At both primary and post-primary level, 42% of teachers who had received a school visit felt that the service received was either “fair” or “poor.”

ICT access

- All schools were found to provide both teachers and students with relatively high levels of access to computer facilities.
 - At primary level, the teachers of senior classes were more likely than teachers of junior classes to be provided with computer facilities for use at home. Furthermore, the location of computers in classrooms, as distinct from computer rooms, provided greater ICT access opportunities for students.
 - At post-primary level a little over a third of the teachers surveyed reported having access to computers in their own classroom. Teachers of subjects that require specialist rooms were more likely to have ICT facilities in their classroom. There is a greater permeation of computers in specialist rooms than in general classrooms at post-primary level.
- Case-study primary schools were generally found to have restricted internet access. Most schools had access by means of a dial-up connection only; in some schools access was limited to one computer, while others had no access at all. Networking is developing in primary schools, although at a relatively slow pace.
- Special-education teachers, particularly at primary level, were found to have good access to ICT facilities in their support settings.

Computer rooms

- Computer rooms are generally a feature of larger primary schools but are liable to be used for a range of purposes. Most schools do not have space for such rooms. Both the national survey of principals and case-study evaluations found, however, that access to computers was more frequent and more relaxed in situations where computers were located in classrooms.
- The average number of computers found in the computer rooms of case-study post-primary schools was twenty-four. Most computer rooms were networked and had broadband access or

were working on acquiring such access. The timetabled occupancy of these rooms per week ranged from 30% to 90%, with the average being a little over 60%.

Software and web sites

- While computer applications are used often as a teaching aid, particularly in the area of special educational needs, not all staff members in schools are clear about the nature and range of software that is already available to them in their school. Most of the software in primary schools is content-rich and is predominantly used to promote literacy and numeracy.
- A sizable proportion of schools do not have their own web site. Of those that do, many do not actively promote it or use it to maximum effect. Schools do, however, experience difficulties in developing and maintaining a web site.

3.11.2 Recommendations

Recommendations for policy-makers and policy advisors

- Consideration needs to be given to improving the level of ICT resources available to schools. Ireland should be working towards enabling schools to equip all classrooms with an appropriate level of ICT infrastructure. Consideration should be given to equipping all classrooms with a computer for use by the teacher, broadband internet access with adequate bandwidth, and a fixed data projector and screen for use by the teacher in presentations. Furthermore, to ensure appropriate access to ICT by students, Ireland should strive to reduce its student-computer ratio (SCR) from the present 9.1:1 in primary schools and 7:1 in post-primary schools. International evidence suggests that countries that have taken a lead in this area are aiming for or achieving a ratio of 5:1 or less in all schools. Funding for ICT in schools should seek to provide schools with the capacity not only to acquire ICT facilities but also to upgrade their ICT systems and to manage obsolescence of computers and other equipment on a planned basis.
- ICT maintenance in schools needs to be addressed in a co-ordinated fashion at system level so that all schools can benefit from having a secure and reliable infrastructure that will facilitate the integration of ICT throughout the school. This could entail the introduction of a quality ICT maintenance initiative for schools. (See section 7.3.1 for further comment on this recommendation.) The role of the ICT advisory service should be reviewed within the context of such an initiative.
- Schools that have effectively implemented their own learning platforms should be identified as models of good practice for other schools. The NCTE could play a role in identifying such schools and in disseminating information about their practices among other schools.

- The NCTE, in collaboration with the SESS, should develop existing guidelines (and create new guidelines where appropriate) for schools regarding the range and type of assistive technology devices and software available for use with students with special educational needs.
- Most schools require advice, guidance and assistance regarding the development and maintenance of a school web site. The NCTE should explore how schools might be further supported in this regard.
- There is a lack of appropriate software in schools to promote Irish, as well as software using Irish instructions. Software companies should be encouraged to fill this void.
- Primary schools require guidance regarding the purchase of computer hardware and software, particularly in relation to the purchase of ICT peripherals. The NCTE is well placed to provide this advice.

Recommendations for schools

Support services

- Schools should make use of relevant specialist support services as fully as possible. School principals and ICT co-ordinators should encourage classroom and subject teachers to liaise with such services where applicable.

Funding

- Schools should endeavour to allocate a separate annual budget for the maintenance and development of their ICT systems. Furthermore, schools should use ICT grants promptly when they are received.
- The usefulness of older computers and equipment should be reviewed regularly. If it is decided that computers are obsolete they should be disposed of properly.

ICT equipment and resources

- As resources permit, schools should work towards providing all teaching and learning spaces with ICT facilities. At primary level the emphasis should be on locating computers in classrooms, as this seems to provide greater access opportunities for students. At post-primary level, schools should ensure, as far as possible, an equitable distribution of facilities between specialist and general classrooms. As an interim arrangement schools could give consideration to setting up a mobile ICT facility that could be shared between classrooms.
- As appropriate opportunities arise, schools should develop the range of ICT peripherals and software available to facilitate teaching and learning. Consideration should be given to acquiring data projectors, digital cameras and interactive whiteboards.

- Schools should develop inventories of the ICT hardware and software facilities available to their staff. These inventories should be updated and circulated to staff members regularly so as that teachers are fully informed at all times of the range of ICT facilities available to them.
- Schools should carry out a regular ICT needs analysis in the area of special educational needs. This would help ensure the best match possible between specialised technology and applications and the needs of students with special educational needs.

ICT access

- Schools should ensure that staff members and students have adequate access to the internet.
- Schools with a computer room (or rooms) should ensure maximum access to the room for their students. To facilitate this, in addition to appropriate timetabling, a simple and accessible system for booking the room should be adopted for teachers. It is also important that rules for the computer room are established and that these are regularly brought to the attention of all users of the room.
- The provision of a dedicated e-mail service to schools and their teaching staff should be given priority within the introduction of the schools broadband network. Efforts should also be directed at encouraging teachers to use e-mail as part of their classroom practice.

The on-line environment

- Schools should strive to develop their own on-line learning platform. In addition, schools should develop their own web sites so as to facilitate better awareness of school activities, developments, and policies in the school and the wider community.

Administration

- Schools should fully exploit the benefits offered by ICT in school administration, especially in the areas of students' records and timetabling.



Chapter 4

ICT planning in primary and post-primary schools



4.1 Introduction

This chapter is concerned with ICT planning in schools. It begins by reviewing the planning process in schools and then takes a close look at the management and co-ordination arrangements that prevail in schools with regard to ICT provision. In this context, reference is made to the work of ICT steering committees and ICT co-ordinators. The chapter then looks at the ICT plan or, more specifically, how such plans are developed and what they contain. The acceptable-use policy (AUP) is another important aspect of ICT planning, and this is also examined. The chapter also considers the implementation of ICT planning in schools, particularly with regard to teachers' access to, and take-up of, ICT professional development training, the extent of usage by individual teachers of ICT for lesson-planning purposes, and the level of planning conducted for the actual use of ICT in teaching. The chapter concludes by looking at schools' strategic planning for the development of ICT from the viewpoint of principals and teachers.

4.2 The planning process

The Schools IT 2000 initiative (referred to in chapter 1) was in many ways the catalyst for the development of ICT planning by schools. Through a variety of methods, the initiative sought to provide schools with support that would assist them in their ICT planning and in other areas of technology integration and skills development. The model of school planning encouraged under this initiative was one that integrated regular monitoring and periodic and systematic review. The initiative also required schools to adopt an ICT plan in order to attract funding.

In 2002 the NCTE issued an ICT planning and advice pack to all schools. The pack provided information and advice to help schools in preparing and implementing their ICT plan. The pack also offered schools a mechanism for the self-review of their ICT status. It also helped them to target their ICT funding more strategically.

The pack advised schools to follow six steps in developing their ICT plan:

- (a) Consider what the educational objectives and priorities of the school ICT plan should be. In particular, the plan should emphasise the effective use of ICT in teaching and learning situations, rather than concentrating exclusively on the acquisition of equipment or ICT skills.
- (b) Convene an ICT steering committee to manage the development and implementation of the plan and to make the planning process fully inclusive.
- (c) Conduct an audit of the school's resources to determine the level of ICT provision and identify the extent to which the provision is meeting the needs of teachers and students.
- (d) Consider the following five areas as a framework for the plan: ICT management and planning, ICT and the curriculum, staff members' professional development, school's ICT culture, and ICT resources and infrastructure.
- (e) Consider budgetary matters associated with the implementation of the plan. When preparing the budget, ensure that provision is made for purchasing, developing and maintaining hardware, peripherals, networks, and software.
- (f) Ensure that the school has an ICT co-ordinator whose role is clearly defined, particularly with regard to the continuing implementation of the plan.

In general, it would appear from this evaluation that the support documents made available by agencies and services such as the NCTE, the School Development Planning Support (SDPS) service at primary level and the School Development Planning Initiative (SDPI) at post-primary level, coupled most likely with a combination of other influencing factors,⁴³ have had a positive impact on the level of ICT planning in schools. An analysis of the national survey of principals, for example, found that more than three-quarters of primary schools (78%), and nearly nine out of ten post-primary schools (88%), made use of the NCTE's *ICT Planning and Advice for Schools* (2002). Furthermore, 65% of primary schools were also found to have made use of other ICT planning documents made available by the SDPS. The survey also revealed that 71% of primary schools had a written ICT plan. The corresponding figure for post-primary schools was considerably lower, at 46%. It was also found, however, that whole-school ICT planning was much more prevalent than ICT planning at the level of the individual teacher.

In the primary case-study schools responsibility for managing and co-ordinating ICT normally lay with the principal. However, in a number of these schools the duties were undertaken by an ICT steering committee, or the deputy principal, or an ICT co-ordinator, or a combination of personnel. At post-primary level the role was more usually undertaken by a nominated ICT co-ordinating teacher. Few schools were found to have convened ICT steering committees to assist with planning for the development of ICT in their school.

⁴³ Factors such as the ICT planning days that were organised throughout the country for school principals by the NCTE, the advice provided by the NCCA on ICT planning for primary schools in its *Information and Communications Technology (ICT) in the Primary School Curriculum: Guidelines for Teachers* (2004), and the introduction of whole-school evaluation (WSE) and other inspection activities by the DES.

4.2.1 The ICT steering committee

The evaluation found that ICT steering committees were not prevalent in schools. Only four of the thirty-two primary and twenty post-primary case-study schools visited had established a permanent ICT steering committee. A small number of schools, however, were found to have established a temporary committee.

One of the two primary schools that had an ICT steering committee had an enrolment of a little less than two hundred students. In this case the permanent committee of teachers acted as a support to the principal, who had the main responsibility in the school for the co-ordination of ICT. In the second primary school, with an enrolment of fifty students, a temporary committee of three people had been established to assist only in the review of the school's ICT policy.

A number of factors contributed to the lack of steering committees in primary schools. Firstly, the size of the school tended to affect whether such a committee was established or not: small schools tended not to have access to sufficient personnel to convene a committee. Secondly, the size of a school's ICT infrastructure was an influencing factor: small-scale infrastructures tended not to warrant the convening of a committee. Thirdly, some schools were reticent about setting up a committee because of people's normal work load.

The ICT steering committee in one of the two post-primary schools that had such a committee comprised four people, while the second school had six on its committee. Each of these committees included a member of the school's senior management, the school's ICT co-ordinator, and representatives of the teaching staff. One school visited committed itself in its ICT plan to setting up an ICT planning team whose membership would comprise "representatives from teaching and administrative staff, students and parents."

In three case-study post-primary schools it was found that an ICT steering committee, or planning group, had been convened for the sole purpose of managing the development of an ICT plan for their school, and once this task had been completed the meetings of the committee ceased. One of these schools described itself as having an "informal ICT steering group." In the evaluation report the inspector commented:

Currently, there is an informal ICT steering group. However, the school intends to set up a formal ICT steering committee with representatives of all subject departments. This group will have the objectives of ensuring that all subject departments' ICT needs are met, that there is effective integration of ICT in the classroom, that monitoring and consideration of technological developments take place and that monitoring and review of the ICT plan and development of the school's ICT plan in the areas of hardware and software renewal are implemented. The formation of an ICT steering committee is encouraged. The school has developed a system of rotating the position of committee chairpersons as part of its school development planning process and implementation of this system with the ICT steering committee is acknowledged as beneficial.

Notwithstanding the small number of schools with ICT committees, it is considered good practice to have such a committee. An ICT steering committee in a school can contribute to the general development of ICT. Furthermore, the development of an effective ICT plan becomes a shared process, and the remit of such a committee can go beyond the development of the plan: it can also include a monitoring role with regard to progress in implementing the plan.

To maximise participation by the school and the community in ICT planning, schools—particularly post-primary schools and larger primary schools—should convene an ICT steering committee to manage the development of an ICT plan and monitor its continuous implementation. Consideration should be given to involving members of the board of management, parents, and the local community.

4.2.2 The ICT co-ordinator

The job of managing and co-ordinating ICT in a school was found to be the responsibility of a nominated co-ordinating teacher in all twenty post-primary case-study schools that were evaluated. Such a role for a teacher was found to be much less common in primary schools, where the task fell predominantly to the principal.

The vision and enthusiasm of the primary-school principal and teachers (or, in some instances, the school management, comprising both the board of management and the principal) in engaging with ICT and developing it in their school was commended in 26 of the 32 case-study schools visited. In most of these schools the principal had assumed responsibility for ICT and was generally described as having introduced it into the school. The principals promoted its use throughout their schools and were described by inspectors as “keen,” “committed,” “interested,” and “enthusiastic.” It was clear from the reports that the success of the integration and development of ICT in schools was dependent very much on the vision and commitment of the principal. One report stated that

the principal's commitment in terms of time and effort, and his vision for infrastructural development, staff development and management of routine ICT issues are most commendable particularly in view of the many constraints identified by school personnel during the visit.

The principals in these twenty-six schools were usually aware of the benefits to be had from using ICT and were generally found to be actively considering how challenges could be met. They were described as being open to new ideas and committed to embedding ICT in teaching and learning.

Schools varied in the way they integrated the role of a nominated ICT co-ordinating teacher in their school management structure. While there was a nominated co-ordinating teacher in only a few of the primary case-study schools evaluated, the work carried out by such a person was usually either part of the duties attached to the post of responsibility of a special-duties teacher (SDT) or the sole duty of such a post.

In the majority of the twenty post-primary schools visited, the role of ICT co-ordinator was attached to a post of responsibility, and while most of those took the form of an SDT post, a few were attached to an assistant principal post. In a few post-primary schools it was found that either the principal or the deputy principal undertook the role of ICT co-ordinator, while in a smaller number of schools it was found that the role of ICT co-ordinator was not part of the post of responsibility structure at all. Finally, in one post-primary school visited the person acting as ICT co-ordinator did so in a voluntary capacity. It was clear from all the evaluations, however, that there was little consistency among the different schools in the work load attached to posts.

While it was found that teachers who acted as ICT co-ordinators were key players in schools' ICT planning, planning duties were not the only ones attached to their role; indeed in some schools ICT planning constituted only a minor part of the role. In general it was found that, while the duties of the ICT co-ordinator were clearly defined in only a small number of schools, there was considerable variety in the tasks undertaken. Examples of duties attached to the role at both primary and post-primary level included:

- managing the development of the ICT plan and co-ordinating its implementation
- involvement in curriculum development
- ICT resources management, to include the auditing and purchasing of resources
- installing software
- system administration, maintenance, and technical support
- liaison with subcontracted technical support
- liaison with the NCTE and other relevant support services
- networking issues
- identifying training needs and facilitating staff training
- developing relevant links with outside agencies.

At first glance this list might suggest that ICT co-ordinators had a relatively high level of technical expertise. While some had, others did not have the capacity to manage and maintain modern ICT equipment and resources. A number of schools (as referred to in chapter 3) had external maintenance contractors, and frequently in those schools the ICT co-ordinator was solely responsible for collaborating with such contractors.

Most of the interviews with ICT co-ordinating teachers revealed that they would like to see their role having a greater emphasis on pedagogy than on the area of systems administration and maintenance. In the main it was found that opportunities did not present themselves regularly for ICT co-ordinators to work with colleagues on relevant pedagogical ICT issues. Instead co-ordinators found a lot of their time was taken up with technical or troubleshooting issues. One co-ordinator spoke of the role in the following terms:

I don't consider myself as a formal ICT co-ordinator, but more as an IT technician and advisor. I maintain the IT system and network in the school; I service, repair and build computers. I install software, set up equipment for presentations, source quotations for new equipment and submit projects to management.

Co-ordinators complained that this advisory or “troubleshooting” role sometimes distracted them from their teaching duties, especially where colleagues called on them to solve technical issues during teaching time. Another issue regularly reported by co-ordinators was the lack of time available to them for performing their duties effectively. This was noted particularly where a significant element of technical support was required of the co-ordinator.

It was clear from the case-study school evaluations that the use of ICT was more efficient if someone in the school had direct responsibility for its management and co-ordination. Furthermore, efficiency was found to be optimal in those schools where the role of the co-ordinator was clearly defined and the relevant tasks were discharged accordingly. In this regard schools should consider the following duties:

- co-ordinating the development and production of the ICT plan
- identifying training needs and facilitating staff training
- developing strategies for the integration of ICT throughout the curriculum
- liaison with senior management and advising on ICT strategies
- evaluating the use of ICT and encouraging greater use by teachers and students
- developing a means by which the ICT infrastructure can be maintained and upgraded.

School management personnel should ensure that their ICT co-ordinating teacher has adequate time to perform their duties in an effective manner. The ICT co-ordinator has a significant role to play in the successful integration of ICT throughout the curriculum in any school, and to achieve this they need to devote time to assisting their colleagues in using ICT to aid teaching and learning. They also need to liaise with the NCTE and other relevant support services.

ICT co-ordinators in schools would benefit from engaging with one another on a professional level, sharing information and learning from one another, as well as organising such activities as training and exhibitions. ICT co-ordinators should therefore be facilitated in setting up an association or network of schools’ ICT co-ordinators.

4.2.3 The ICT plan

An analysis of the national survey of principals found that 157 (71%) of the 220 primary principals who responded to the question reported that their school had a written ICT plan. At post-primary level 50 (46%) of the 108 principals who responded had such a plan. Furthermore, the survey revealed that slightly less than half (48%) of primary schools and slightly more than half (55%) of post-primary schools with such plans updated them at least annually. Larger schools were more likely to have an ICT plan and to update it regularly than smaller schools.

Drawing up the ICT plan

The survey of principals found that a variety of practices exist in schools with regard to the development of ICT plans. The survey revealed, for example, that 96% of both the primary and

post-primary schools that had an ICT plan provided opportunities for teachers' involvement in the formulation of their plans. At primary level the majority of schools (54%) reported also involving their board of management in the process, while fewer than half (42%) reported involving in-school management personnel. Some 58% of post-primary schools reported involving their board of management in the process, while 78% involved senior in-school management personnel.

Parents and local businesses or community representatives were the two groups least likely to be involved in the development of a school's ICT plan. Only 24% of primary and 38% of post-primary schools reported involving parents in the development of their plan, while 4½% of primary and 20% of post-primary schools reported involving local businesses or their local community, or both.

Similar personnel were found to be involved in any review of the ICT plan that took place. The survey found that practically all principals in the primary and post-primary schools that had an ICT plan reported involving teachers in any review of the plan. Some 79% of post-primary schools reported that senior in-school management personnel were involved in the review process, while 48% of primary schools reported that their board of management was involved.

The case-study school evaluations provided a greater insight into how schools develop their ICT plans and highlighted a number of significant issues:

- In a small number of case-study schools the ICT planning process involved only school management personnel, usually a member of the school's senior management (for example principal or deputy principal) and the ICT co-ordinator. It was noted in the evaluation reports for schools where this occurred that some teachers were unaware of the existence of an ICT plan for their school.
- Teachers regularly reported during interviews that their school did provide them with opportunities to get involved in the development of their school's ICT plan. This usually took the form of management inviting staff members to contribute their views on the plan as it went through its various stages of development. Many teachers, however, spoke of not availing of this opportunity. This was generally attributed to their lack of time or lack of knowledge of ICT plans.
- Few schools were found to have either sought or received support from their local ICT advisor when developing their plan. Furthermore, while the NCTE provided seminars around the country for school principals on school planning for ICT, few made reference to any benefits that they gained from attending.

It is clear that schools should seek the services of relevant support services to support their work in ICT planning. Schools also need to become more active in engaging teachers and relevant sections of their community in the development of their ICT plan.

Contents of the ICT plan

Principals of schools that had an ICT plan were asked in their national survey to state the areas that were addressed in their plan. Fig. 4.1 and fig. 4.2 provide details of the common areas addressed in the ICT plans of primary and post-primary schools, respectively.

Fig. 4.1: Contents of ICT plans, primary schools

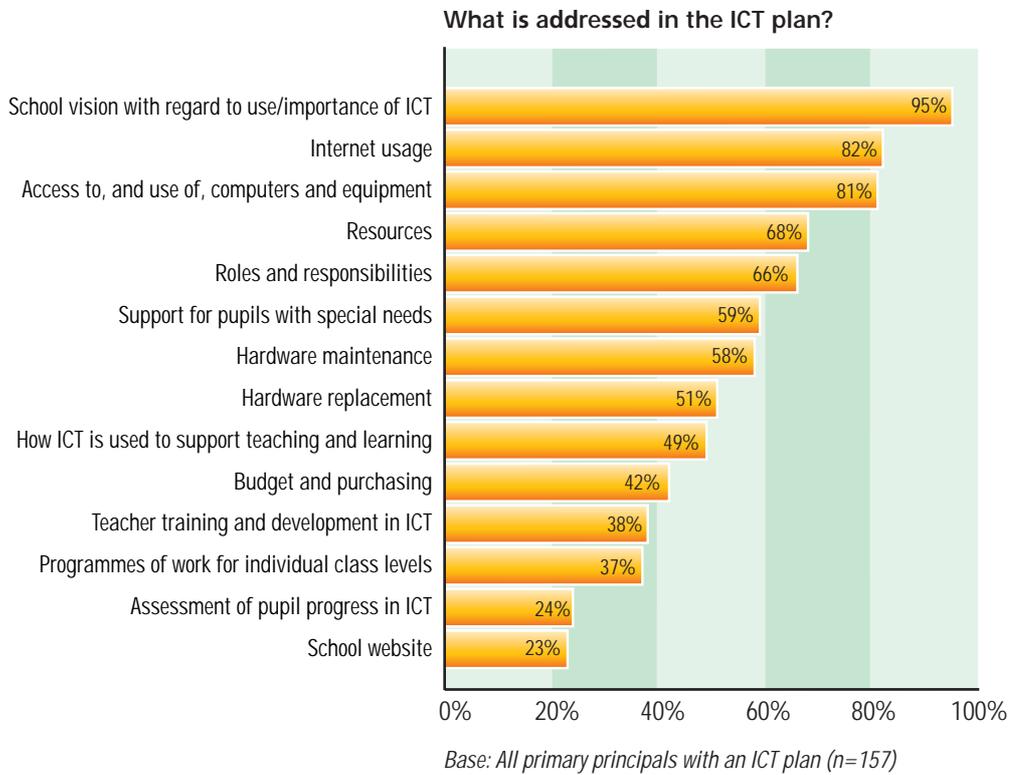
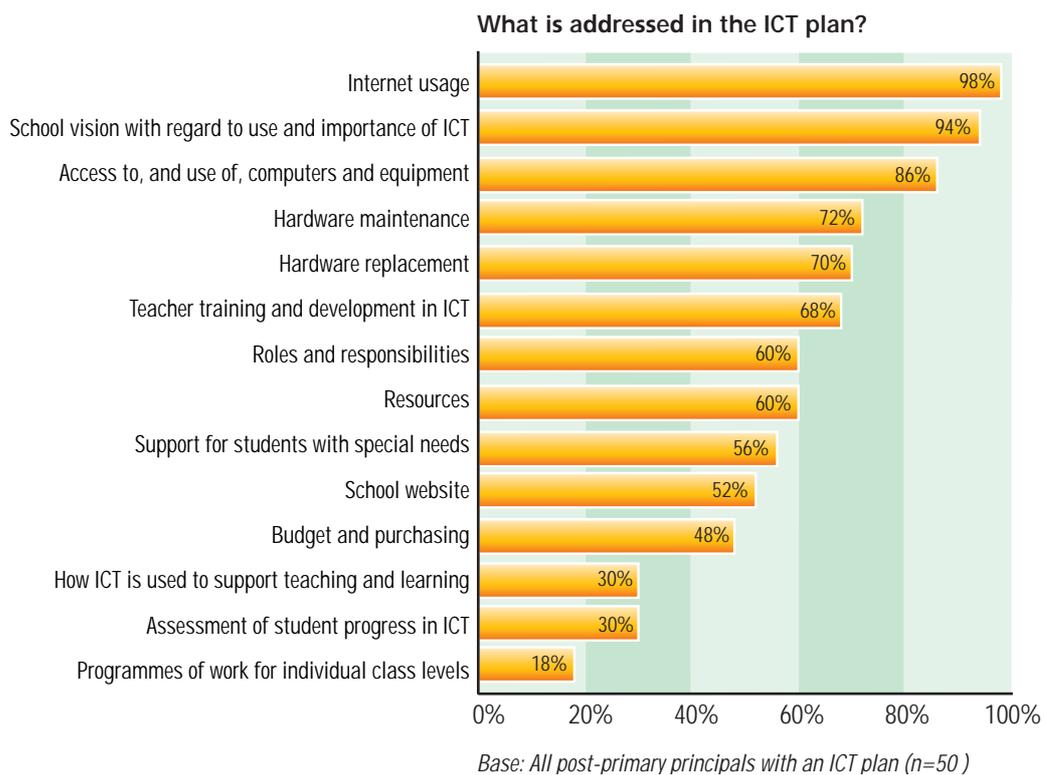


Fig. 4.2: Contents of ICT plans, post-primary schools



The main topics addressed in primary and post-primary ICT plans were “school vision with regard to the use and importance of ICT,” “internet usage,” and “access to, and use of, computers and equipment.” Such issues as “hardware maintenance,” “hardware replacement,” “resources” and “roles and responsibilities” were also common. References to “how ICT is used to support teaching and learning,” “programmes of work for individual class levels” and “assessment of student progress in ICT” did not feature prominently in plans.

As would be expected, the contents of the ICT plans reported by principals in their survey and those reviewed by inspectors in case-study schools were broadly similar. Some of the plans reviewed included hardware and software inventories, and where these were not included inspectors generally recommended that they be compiled. Some schools were also advised to consider the possibility of using ICT to engage in collaborative projects with schools from other countries. Also, in contrast to the findings of the survey of principals, details of how ICT was used to facilitate teaching and learning featured highly in the ICT plans of the post-primary case-study schools visited. This may have been influenced, however, by the fact that case-study schools were notified in advance of their participation in the evaluation; there was evidence that certain review or upgrading work was undertaken in respect of some ICT plans before the visit of the inspector.

On the whole, schools’ ICT plans concentrate more on infrastructural issues than on how ICT can be used to enhance teaching and learning. This is evidenced by the fact that more plans referred to hardware maintenance and replacement issues, to roles and responsibility issues and to access issues than to issues concerned with the actual use of ICT in the classroom. Only 37% of the primary schools surveyed and 9 of the 32 case-study primary schools evaluated, for example, included programmes of work for individual class levels in their ICT plans. Furthermore, less than a quarter of those surveyed and only four case-study schools included details of how they assessed students’ progress in the development of ICT skills. At post-primary level few schools included details of how they would assess, if at all, students’ progress in the area of ICT skills development as they moved from junior cycle to senior cycle.

Furthermore, few school plans included details of the work their students were exposed to as part of their dedicated computer studies lessons. In effect, this meant that little or no programme planning existed with regard to students’ dedicated ICT lessons. In planning for dedicated ICT lessons, best practice was observed when ICT plans outlined the relevant aims, objectives, time allocations, grouping of students, course materials used, planning for students with special needs, teaching methods, health and safety considerations, and assessment strategies. It was also considered best practice when continuity and progression in work were clear from the programmes of work in the ICT plans. Post-primary schools should plan an appropriate curriculum for all class groups that are provided with dedicated ICT lessons.

The inspectors regularly recommended to case-study schools that they review their ICT plan and in so doing that they recast the balance between the infrastructural and the educational focus. One primary school evaluation report, for example, commented:

The school has an ICT plan which takes into account areas such as: development of the ICT facilities, timetabling, network, usage, assessment, teacher usage of equipment, staff development, educational objectives, ICT and special needs, and an ICT roadmap which outlines some of the skills which students are expected to acquire during their time in school. Although this list of skills is very suitable it could be further expanded and developed and consideration should be given to delineating at what class level these skills are achieved by students.

One post-primary school report commented:

Though the plan describes in detail the hardware and software provision that is envisaged the document does not deal with how ICT is to be integrated into teaching and learning. It is recommended that the plan be reviewed to include a strategic vision for the development of ICT and its integration in teaching and learning in the school.

A school's ICT plan should emphasise the use of ICT in teaching and learning situations. The NCTE's document *ICT Planning and Advice for Schools* (2002) provides advice to schools on what should be included in an ICT plan. The planning matrix (see appendix) provides a suggested framework for the contents of a plan, including: ICT management and planning; ICT and the curriculum; staff members' professional development; schools' ICT culture; and ICT resources and infrastructure.

It is recommended that schools develop their own ICT plan. The process of developing the plan should be a consultative one, with opportunities at post-primary level for appropriate consideration to be given to subject-specific needs by relevant subject departments. Relevant support documents should be fully used. Plans should emphasise the use of ICT in teaching and learning. To this end, for example, plans should include information on how ICT is used to facilitate teaching and learning, details of programmes of work for individual class levels, and particulars of how students' progress in ICT is to be assessed. Once agreed, the plan should be brought to the attention of all members of the staff, and its regular monitoring and review should be implemented. This is an area where more extensive use could be made of the the significant expertise of ICT co-ordinators.

4.2.4 The acceptable-use policy

With the introduction of broadband access to schools⁴⁴ and the heightened awareness of the risks of students having access to undesirable material on the web, the evaluation showed that there was a strong emphasis in schools on developing an appropriate internet AUP.

The survey of principals revealed that more than 80% of both primary and post-primary schools had an AUP. While practically all AUPs in schools applied to students, the survey also showed that 80%

⁴⁴ Schools are required to certify that they have an AUP before they are connected to the schools network under the Schools Broadband Access Programme managed by the NCTE.

of them at primary level and 75% at post-primary level applied also to teachers. At primary level 57% applied to ancillary staff members, while at post-primary level the corresponding figure was 55%. From the survey of teachers it was found that approximately 70% of primary and 63% of post-primary teachers were familiar with their school's AUP. This proportion tended to increase at primary level with regard to those teachers with more teaching experience, while at post-primary level it was unexpectedly lower for schools with a low SCR.

AUPs were prevalent in case-study schools, with almost all the schools evaluated having one. Inspectors' reviews of these policies found that practically all of them covered the use of the internet. Few, however, referred to the health and safety risks, predominantly ergonomic in nature, associated with the use of computer hardware.⁴⁵ It is recommended that schools have guidelines to cover such areas.

Devising a policy on acceptable use of the internet is an important step in addressing the issue of internet safety in the school. All schools should have their own acceptable-use policy for computer hardware, software, and the internet. As was the case in some case-study schools, this should be developed in partnership with parents and should address, among other things, all the rights, privileges and responsibilities associated with use of the internet and on-line services. It should incorporate a code of conduct that should be agreed by all participants and be incorporated in the school's ICT plan. The NCTE's *Internet Safety Pack* (2007) and the template for developing an AUP on the Department's website can act as a resource for all schools in this regard.⁴⁶ The template is the latest version of one originally developed by the NCTE for inclusion in its publication *Be Wise on the Net: Information and Advice for Schools* (2002).

4.3 Implementation of ICT planning

It is important that schools do not view the development of an ICT plan as an end in itself. However, some schools clearly do so when they convene a team to develop a plan and then disband the team once the task is complete. An effective ICT plan, if implemented daily and in accordance with its underlying principles, will have an impact on the use and development of ICT in a school. Schools should ensure, however, that they have procedures for the regular monitoring and review of their ICT plan. There are a number of ways in which a school can do this, including (as alluded to in section 4.2.1) the role that an ICT steering committee can play in monitoring its progress.

Two areas were examined to provide an accurate indication of the extent of the implementation of ICT planning. The first is concerned with the professional development of teachers. For example, to what extent were schools actively facilitating teachers in attending appropriate training that would allow them to integrate ICT in their classroom practice? The second area explored was the extent of

⁴⁵ There may be risks of eye strain associated with the prolonged use of monitors, as well as risks to a user's posture from the prolonged use of computers.

⁴⁶ See www.education.ie for the ICT policy template, along with templates for common school policies.

use of ICT by teachers in their lesson planning and preparation work, as well as the extent of their planning for the use of ICT in the teaching and learning process. Was the school's ICT planning having an impact at the level of the individual teacher and classroom?

4.3.1 Teachers' professional development

An analysis of the national survey of principals found that approximately 30% of primary schools and 57% of post-primary schools had provided at least one in-school or external ICT training course for their staff within the previous three years.

Schools' provision of ICT professional development for staff

Fig. 4.3 shows that 17% of the 234 primary-school principals who responded to this survey question stated that in-school training was provided, while 16% reported that external training was provided within this time frame. Primary schools were found to rarely offer both in-school and external staff training.

Fig. 4.3: Staff ICT training in primary schools within the previous three years

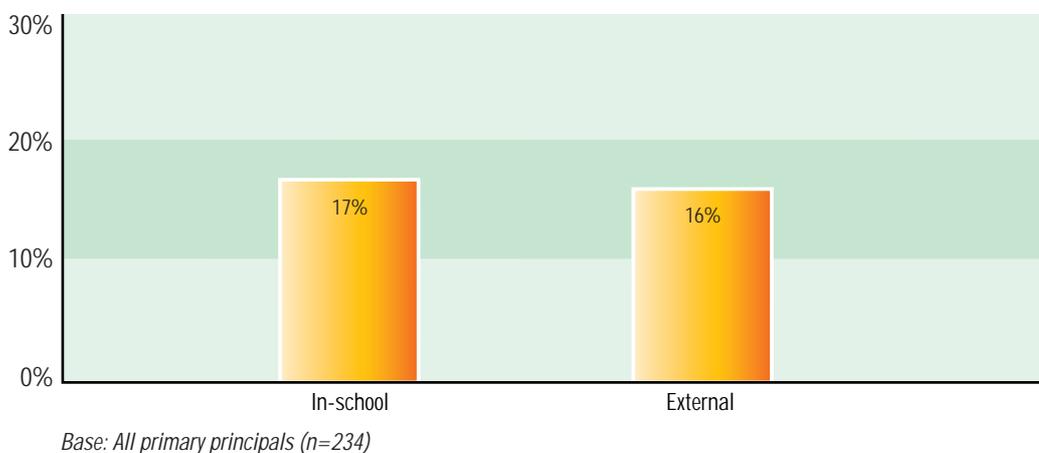
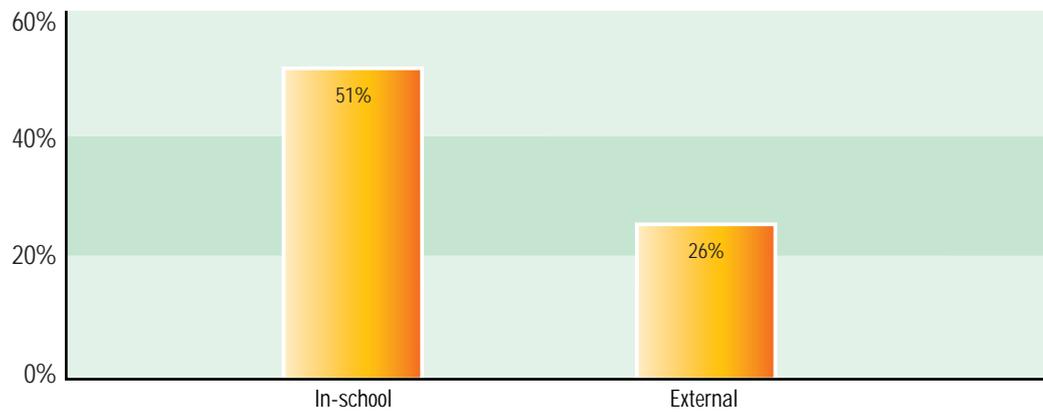


Fig. 4.4 shows that slightly more than half (51%) of the 110 post-primary principals who responded stated that in-school training was provided, while about a quarter (26%) stated that external training was provided within this time frame.



Fig. 4.4: Staff ICT training in post-primary schools within the previous three years



Base: All post-primary principals (n=110)

Schools' ICT co-ordinators (as well as the principal in the case of primary schools) were generally found to facilitate any in-school training provided, and sometimes presented the training also. At post-primary level it was common for a member of the teaching staff to present such training. The NCTE and the ICT advisory service were generally found to facilitate external training in local education centres. Subject associations also played an important role in facilitating teachers with external training, especially in subject-specific software training.

The survey found that a higher rate of in-school training was organised by larger schools (36% of primary schools with more than 200 students, compared with only 5% with fewer than 100 students; 59% of post-primary schools with more than 400 students, compared with 41% with fewer than 400 students). It is likely that this is because of the higher concentration of staff members, and therefore possible participants, in the larger schools. However, it is possible for small schools to work together in groups to organise specific training for their staff members. In the case of external training the survey showed no notable difference in the rate of provision between school type, sector or size at either the primary or the post-primary level.

The type of ICT professional development courses attended by teachers

The extent of teachers' attendance at ICT professional development courses was garnered from the national survey of teachers. They were asked to state, from a list provided, what courses organised by the NCTE or ICT advisory service they had attended. Table 4.1 reveals some patterns in relation to attendance at these courses.

Table 4.1: Teachers' attendance at NCTE and ICT advisory service training courses

Course	Primary teachers	Post-primary teachers
Primary phase 1	34.2%	65%
Primary phase 2	27%	50.3%
Basic troubleshooting	13.7%	8.8%
Computer networking	4.4%	7.5%
Introduction to digital media	22.6%	7.8%
Digital video for learning	6.5%	2.1%
Empowering minds: using control technologies	2.3%	1.1%
Internet and e-mail for learning	24.5%	13.1%
Web site design and development for learning	14.8%	8.8%
Intel "Teach to the Future"	20.3%	20.6%
Support groups	5.7%	3.2%
ICT and special needs: the basics	12%	4%
ICT and special needs: learning support	5.7%	2.9%
ICT and special needs: mild GLD	1.1%	0.5%
ICT and special needs: moderate, severe or profound GLD	0.4%	0.3%
ICT and special needs: deaf or hard of hearing	0	0
ICT and special needs: visual impairment	0.2%	0
ICT and special needs: autistic-spectrum disorders	0.4%	0.3%
ICT and Geography		5.1%
ICT and Mathematics		7.2%
ICT and Science		5.9%
ICT and Guidance		1.9%
Other (e.g. ECDL)	21.1%	5.1%



It is clear from the responses and from discussions with teachers in case-study schools that many felt they had benefited from phase I and II training associated with IT 2000. Table 4.1 also shows that generic programmes of professional development (for example IT 2000 phase I and II, Intel “Teach to the Future”) tend to attract a greater take-up among teachers than those dealing with particular topics or specific subjects. This is presumably due in large part to the fact that generic courses have an appeal throughout the teaching profession, while topic or subject-specific courses are relevant to defined groups within the profession.

While teachers in case-study schools reported during interviews that they had attended professional development courses provided by relevant support services, a substantial proportion stated that they had received limited training during these courses in how to actually integrate ICT in their teaching. While it is understood that such training is an integral part of current professional development programmes, it is recommended that greater attention be paid to this area in the future.

Training methods associated with ICT professional development courses

Primary teachers reported that their preferred training method was a school-based course. Almost four out of five teachers (79%) of the 1,162 respondents rated this method in their top three choices. This method was popular primarily because the training in these settings generally makes use only of equipment and resources that are readily available to the teachers.

Post-primary teachers reported that their preferred training method was a tutor-led course (or face-to-face training) in their local education centre. Nearly three out of four post-primary teachers (73%) of the 800 respondents rated this method in their top three choices. The second choice for primary teachers was tutor-led courses in an education centre (74%), whereas at post-primary level it was the school-based course (69%). The third most popular method for all teachers was a tutor-facilitated ICT support group in the education centre. This finding is particularly important from the viewpoint of the school management: when organising ICT training for staff members, the management should be aware of teachers' preferred training methods.

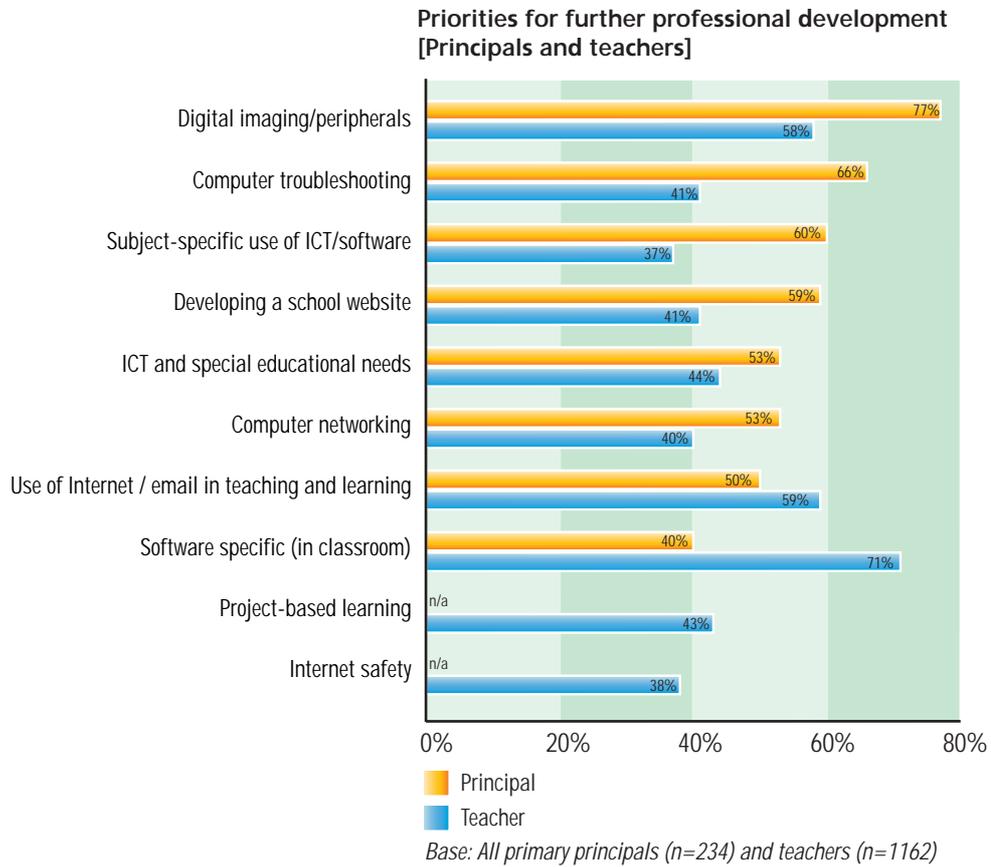
Some issues arose, particularly during interviews with teachers at post-primary level, regarding the courses provided in education centres. Many teachers expressed dissatisfaction with the fact that the majority of these courses took place outside normal school hours, and many spoke of having to travel long distances to attend them. Others also mentioned that there was a distinct lack of "joined-up-thinking" or progression regarding the courses they attended or were offered. A further issue concerned the wide range of abilities and experiences commonly found in groups of teachers attending training courses. Given the varied levels of proficiency of teachers in ICT, however, it is accepted that this is an issue that will inevitably arise. Nevertheless it is recommended that course organisers and presenters take appropriate steps to minimise its impact on the learning experience of the teachers attending a course.

Teachers' further ICT professional development needs

In their survey, principals were asked to specify the areas in which they considered teacher training to be necessary to further facilitate effective teaching and learning in the classroom. In their questionnaire teachers were asked separately to state what they felt were their personal requirements for further professional development. Fig. 4.5 and fig. 4.6 show the responses received from primary and post-primary principals and teachers in relation to teacher education needs regarding effective classroom practice.⁴⁷ In general, the findings suggest that greater communication between principals and teachers regarding the content, and indeed the mode, of ICT professional development would benefit teachers. The evaluation found considerable divergence between the views of principals and teachers regarding the extent and nature of the professional development needs of teachers. Furthermore, it would appear from the findings that principals perceive teachers to have somewhat greater training needs than do the teachers themselves. This is not to suggest, however, that teachers do not have a strong awareness of their training needs.

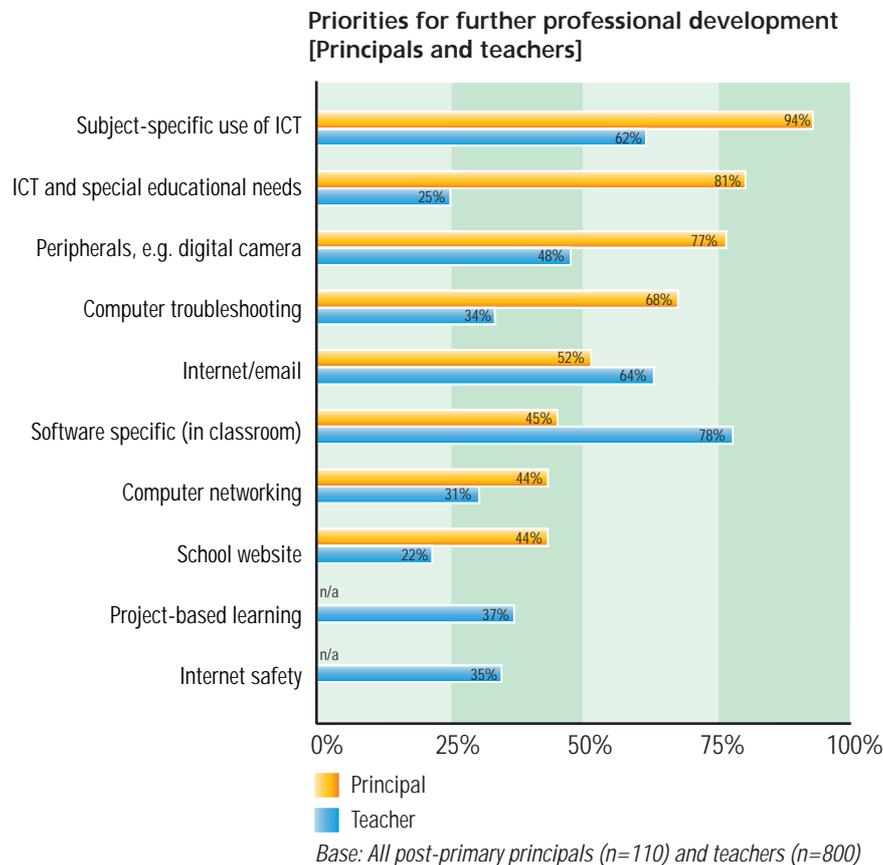
⁴⁷ Although the wording of the priorities in the questionnaire for principals was not exactly the same as that in the questionnaire for teachers, similar items were matched (where possible) between the questionnaires.

Fig. 4.5: Principals' and teachers' views on ICT training requirements, primary schools



Primary-school principals identified further professional development needs for their teaching staff in most items (especially the use of digital imaging and peripherals), while teachers were more interested in the software-specific use of ICT in the classroom. Recent changes to the primary curriculum, coupled with the work of the PCSP, could be contributing to this perceived further training need of teachers.

Fig. 4.6: Principals' and teachers' views on ICT training requirements, post-primary schools



Almost all post-primary principals (94%) reported that teachers required training in the subject-specific use of ICT, while this area of training was given priority by fewer than two-thirds of teachers (62%). Conversely, more than three-quarters of teachers (78%) reported a need for training in the use of specific software in the classroom, while fewer than half the principals (45%) chose this area.

Table 4.2 shows the further ICT professional development preferences of post-primary teachers by subject. It can be seen that teachers of Irish, foreign languages and the social studies I and II groups of subjects were most likely to select further professional development in the classroom use of educational software. These teachers, along with teachers of English, were also slightly more likely to select professional development in using the internet in teaching and learning, in using standard applications, and in project-based learning. This finding could be influenced by the fact that a number of these subjects (for example, History and Geography) require access to sources of information that are most readily available electronically, and that teachers of these subjects would like to be in a position to obtain this kind of information more easily. Recent changes to syllabuses, along with the work of relevant subject support services in schools, could be contributing to this perceived need for further training. The findings also show that there is scope for subject associations to organise or provide subject-specific professional development courses for teachers.

Table 4.2: Professional development preferences of post-primary teachers, by subject

	% of subject teachers who opted for further professional development in the particular area									
	English	Mathematics	Irish	Foreign Languages	Science	Business Studies	Applied Science	Social Studies I	Social Studies II	Total
Classroom use of educational software	74	72	85	83	65	73	74	79	82	75
Classroom use of standard applications (e.g. desktop publishing, spreadsheets)	49	37	55	49	41	51	39	48	52	44
Computer networking	28	34	28	31	38	27	31	28	28	30
Computer troubleshooting	37	33	29	24	42	27	41	35	32	33
Developing a school web site	19	27	19	21	26	29	22	19	25	22
Digital imaging (e.g. digital cameras, digital video)	41	45	49	40	50	52	55	50	51	48
ICT and special educational needs	27	27	27	27	21	22	21	28	26	25
Internet safety	29	32	38	37	30	38	29	34	40	34
Project-based learning	44	30	46	37	37	30	42	42	42	37
Subject-specific use of ICT	64	64	67	74	65	64	54	63	62	63
Using the internet in teaching and learning	74	56	70	75	65	60	54	67	69	64

Good practice regarding teachers' ICT professional development

The quality of a school's efforts to cater for the ICT training needs of its teaching staff was singled out by inspectors as being effective in less than half the primary case-study schools visited and in only a quarter of those post-primary schools evaluated. The use of the word "effective" in reports usually meant that a school had plans to provide its teaching staff with appropriate training and that those plans were being realised, or that it was actively developing training plans for staff members. The identification of the training needs of teachers in the use of ICT also featured strongly in whole-school planning in these schools, as is appropriate. It was also usually noted in reports from these schools that teachers had engaged at some level with various professional development courses in ICT. One primary inspection report stated:

All staff members have had a reasonable level of basic skills training, with some staff [members] currently participating in ICT courses emphasising the integration of ICT in the curriculum. Four teachers have undertaken on-line in-service courses on issues regarding special educational needs in the last term.

One post-primary school inspection report commented:

This training included NCTE Phase 1 and Phase 2 education courses, VEC night classes, European Computer Driving Licence (ECDL) courses, Joint Examining Board certification and Intel Teach to the Future courses.

It was common in these reports to read phrases such as “There was a good level of expertise among staff” or “Teachers were eager to engage in further training.” It was frequently reported that teachers in these schools regularly shared their ICT skills, expertise and experience with each other. Some schools even provided ICT training for parents. Mention was also usually made of the commitment displayed by teachers in attending professional development courses, which usually took place after school hours.

In the remaining case-study schools visited inspectors generally recommended that efforts be directed towards catering for the training needs of the teaching staff, particularly training that would allow them to better integrate ICT in their classroom practice. In particular, schools were advised:

- to implement training plans that existed, or consider short on-site training courses
- to review the ICT training needs of their staff members and develop appropriate training plans for them
- to monitor the training needs of staff members
- to concentrate on the integration of ICT in teaching and learning in any training provided
- to use the expertise already available among staff members, and even among students
- to liaise with the ICT advisor in their local education centre with a view to seeking assistance in developing and running ICT training courses for staff members; schools were also asked to consider liaison with other support personnel
- to include references to professional development plans in the ICT plan for their school
- to develop a mentor system, whereby experienced teachers could assist teachers who were unfamiliar with the technology.

Teachers in case-study schools generally reported that the ICT professional development courses they attended had an effect on the extent of their use of ICT during teaching. While it is difficult to pinpoint the level of this influence, it was interesting to note that when asked to state what factors facilitated the development of ICT in their classrooms, teachers nearly always mentioned their attendance at relevant professional development courses.

4.3.2 Using ICT in classroom and lesson planning and preparation

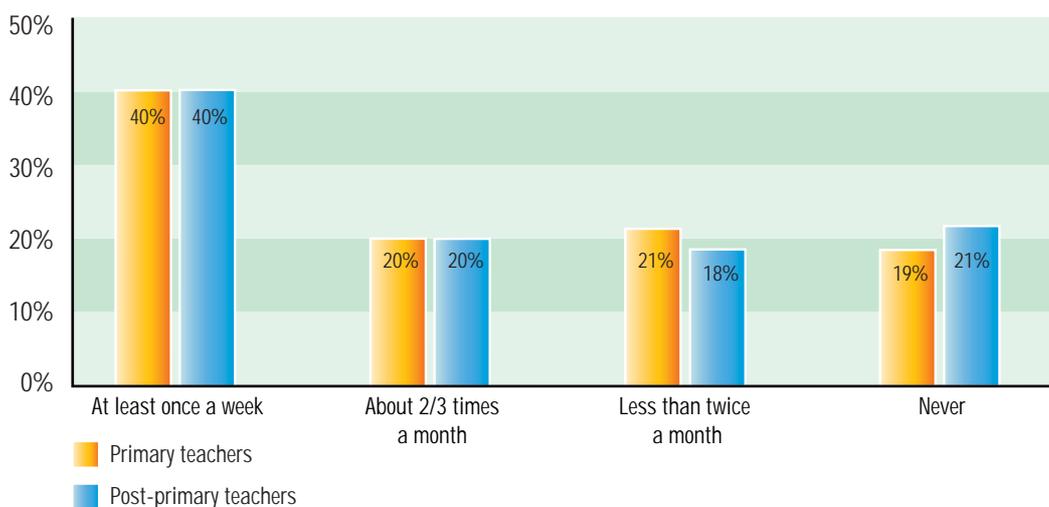
From interviews with individual mainstream teachers and special-education teachers in primary schools, the inspectors found that more than two-thirds (69%) of mainstream teachers and 61% of special-education teachers reported using ICT to plan and prepare for their teaching. Interestingly, teachers in primary schools with a higher SCR were slightly more likely to use ICT to plan (78%) than teachers in schools with a low SCR (65%).⁴⁸ In post-primary schools, inspectors found that nearly four out of five subject teachers (79%) reported that they used ICT when preparing their lessons.

The way in which teachers used ICT in their lesson planning and preparation was explored in some detail through the survey of teachers and the case-study school evaluation reports. One area of interest was the extent of teachers' use of computers and applications as part of their planning and preparation work. An emphasis was also placed on examining whether teachers used internet resources when preparing lessons. Particular attention was given to teachers' use of the Scoilnet web site, the education portal developed and maintained by the NCTE.⁴⁹

Use of computers in lesson planning and preparation

Teachers were asked in their national survey how frequently they used computers for lesson preparation. This could be for creating templates or producing students' worksheets, hand-outs, revision notes, or similar resources. As illustrated in fig. 4.7, 82% of primary and 78% of post-primary respondents reported using computers for this purpose, though at different frequencies.

Fig. 4.7: Use of computers for lesson preparation



Base: 1,162 primary and 800 post-primary teachers

⁴⁸ See note 19 (chapter 2) for a definition of SCR.

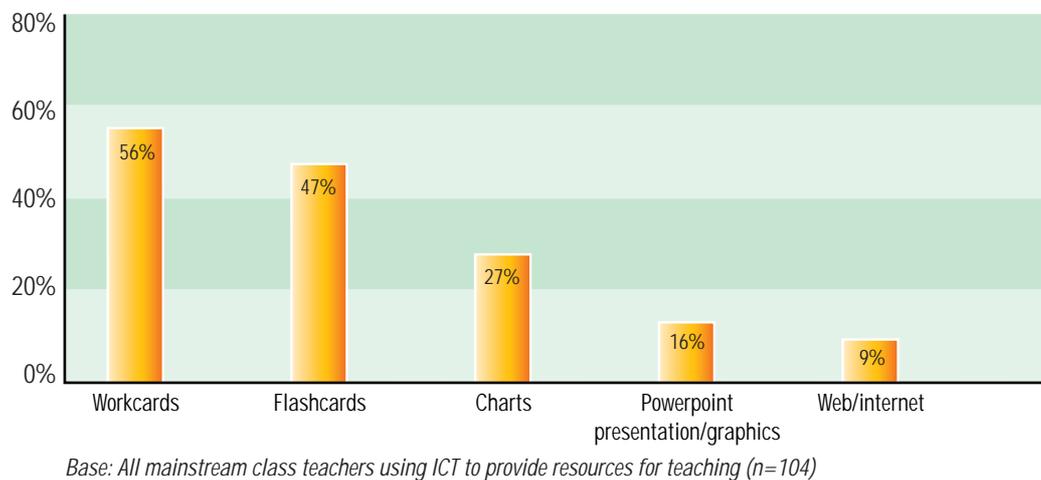
⁴⁹ Scoilnet, according to the NCTE web site (September 2006), is one of the most popular sites devoted to facilitating the work of education professionals. The site was launched in 1998 and is managed by the NCTE. It actively promotes the integration of ICT in teaching and learning by making resources available for downloading, such as lesson plans, interactive and printable worksheets, notes, and multimedia resources. The learning materials for pupils available from the site are curriculum-focused and are selected and reviewed by curriculum specialists and teachers.

The use of the computer for lesson preparation was related to the teacher's age. Of those under thirty-five, 90% of primary teachers and 92% of post-primary teachers reported using computers for preparation purposes, compared with 71% (primary) and 68% (post-primary) of teachers over forty-five.

The post-primary survey showed that teachers in schools with a low SCR were more likely to use computers for lesson preparation (84%). It would be reasonable to assume that this was because of the higher number of computers available for use. While there was little variation in the level of computer use in preparation for teaching and learning in different subject areas, it was found that a lower than average proportion of teachers of Irish reported using computers for this purpose.

Fig. 4.8 gives an indication of the type of resources that primary teachers generate as a result of their use of computers for lesson planning and preparation. It provides details of the responses received from the 104 mainstream primary teachers who reported during interviews with inspectors that they used ICT to provide resources for teaching. Interestingly, those interviews found that teachers in schools with a higher SCR were slightly more likely to use ICT to provide resources or aids for their teaching (89%) than teachers in schools with a low SCR (78%).

Fig. 4.8: Resources provided by mainstream primary teachers using ICT



The reasons why teachers used these resources are varied and consistent with good practice:

- to reinforce existing teaching and learning methods (especially for teachers in schools with a high SCR)
- to improve the teaching and learning of specific curriculum areas (especially for teachers of senior classes)

- to improve literacy, reading and writing skills (especially for teachers of junior classes)
- to introduce more visual and interactive aspects into lessons (especially for teachers in schools with a low SCR).

Computers were found to be used by teachers in their classroom or lesson planning and preparation work in most of the fifty-two case-study schools evaluated, even in those schools where the teacher may not have been included in ICT planning at the school level (as discussed in section 4.2.3). The use of computers for such work in these schools was generally found to be a matter for individual teachers. One post-primary report stated:

At a classroom level it is a matter for individual teachers to plan for the use of ICT in lessons and from discussions with a small group of teachers it was clear that planning for use of, as well as actual usage of, ICT in teaching is uniformly strong. This is facilitated by the existence of ICT hardware and software in certain classrooms.

The use of computers for lesson planning and preparation in the case-study schools, however, was found to vary considerably. At post-primary level in particular their application varied according to the subject being taught. In one primary school it was noted that while each teacher had a copy of their school's ICT plan, "there was little evidence to suggest that the ICT plan impacted on individual teachers' planning or that teachers plan formally for the use of ICT." However, a more typical report was as follows:

[Teachers] wished to further expand their skills in order to become more au fait with the hardware in order to make active use of ICT during lessons. Teachers . . . noted [that] technical difficulties, while using ICT equipment, were a major problem for them and resulted in a negative outlook towards the whole ICT area and their willingness to use the technology.

Practically all twenty case-study post-primary school evaluation reports referred to the fact that "teachers reported using ICT for class preparation, including use of the internet as a resource," or at worst that "teachers' use of ICT in planning or preparation for their teaching was mixed," or that "planning for [the] use of, as well as actual usage of, ICT in teaching occurs at varying levels."

The use of ICT in planning for teaching in special education or learning support was particularly prevalent in case-study primary schools, and this was considered good practice. Inspectors recommended in many instances that such good practice be replicated throughout mainstream teaching settings.

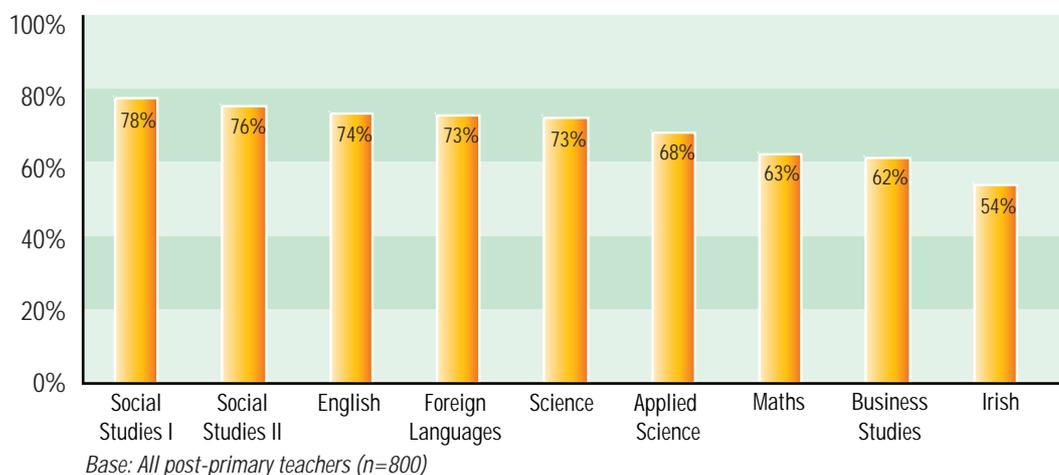
Internet resources

In their survey, teachers were asked about the use they made of internet resources in their lesson planning and preparation. Table 4.3 shows that 69% of both primary and post-primary teachers reported making use of such resources.

Table 4.3: Teachers' use of internet resources in planning and preparation for teaching

	Internet resources							Total
	Age			Gender		SCR		
	Under 35	35–45	Over 45	Male	Female	Low	High	
Proportion of primary teachers answering yes to using internet resources in planning and preparing for teaching	82%	63%	47%	68%	69%	71%	67%	69%
n (primary)	569	270	281	155	893	533	534	1,162
Proportion of post-primary teachers answering yes to using internet resources in planning and preparing for teaching	83%	65%	59%	68%	70%	67%	73%	69%
n (post-primary)	272	210	290	260	468	323	321	800

The survey found that there was a strong correlation between internet use and age: younger teachers were more likely to make use of internet resources than those over thirty-five. It can be assumed that this was partly influenced by their exposure to the benefits of ICT during their teacher training experience. A higher level of use was also associated with those teachers who had computer facilities and internet access in their own classrooms. At primary level the survey also showed that teachers of senior classes were slightly more likely to use internet resources in planning for teaching (74%) than teachers of junior classes (69%). At post-primary level some differences emerged in the use of the internet by teachers for planning and preparation purposes in different subjects, as shown in fig. 4.9.

Fig. 4.9: Use of the internet in planning and preparation for teaching, by subject

A relatively low proportion (54%) of teachers of Irish reported using the internet in planning and preparation for teaching, compared with teachers of social studies I and II subjects (78–76%) and English (74%).

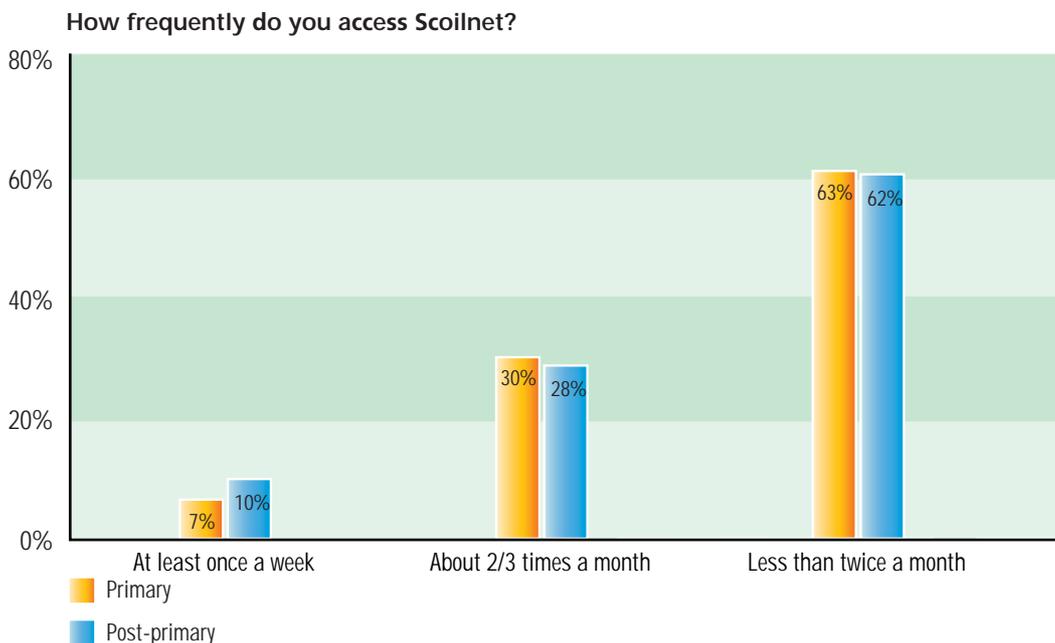
Case-study school evaluations found considerable use of the internet by teachers in their planning work. They generally used it as a means of “accessing planning resources and ideas which served as a stimulus for students.” For example, teachers used the internet to find planning and progress record templates and suggestions for teaching activities. Teachers also mentioned, however, that significant time and work was required to identify, find or generate appropriate materials.

Scoilnet

The survey found that relatively high proportions of teachers use Scoilnet, with some 77% and 67% of primary and post-primary teachers, respectively, reporting that they had visited the site within the previous two years. Use was found to be slightly higher for teachers under thirty-five. While the level of use was similar for primary teachers of both junior and senior classes, the survey showed that there were differences in use by post-primary teachers among the subjects taught. A higher proportion of teachers of the social studies I and II (75–72%) and science subjects (74%), for example, reported making use of the site than teachers of the applied science subjects (60%), Irish (63%), and Business Studies (62%).

In general, however, teachers may be considered as infrequent users of the Scoilnet web site. As can be seen from fig. 4.10, some 63% of primary teachers and 62% of post-primary teachers who used the site stated that they had visited it less than twice a month in the previous two years.

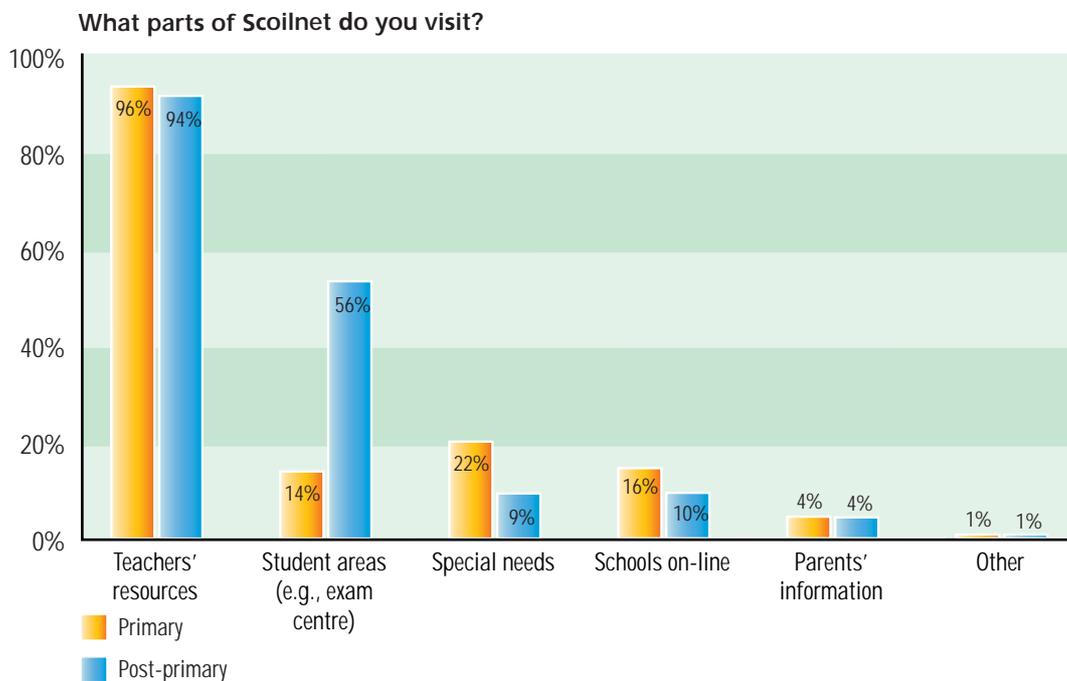
Fig. 4.10: Scoilnet visits by teachers



Base: All primary (n=859) and post-primary (n=532) teachers who used Scoilnet during the last two years

The teachers' resources area of Scoilnet was very popular, with more than 90% of both primary and post-primary respondents who stated that they had visited the site reporting that they had visited this section. This would suggest not only that significant numbers of teachers are already using ICT to help them with their lesson planning and preparation work but also that significant numbers are keen to vary their teaching resources and to explore new ways of engaging students in lessons. All other areas of Scoilnet (except perhaps the post-primary students' section) proved to be much less popular, as can be seen from fig. 4.11.

Fig. 4.11: The most popular sections of Scoilnet among teachers

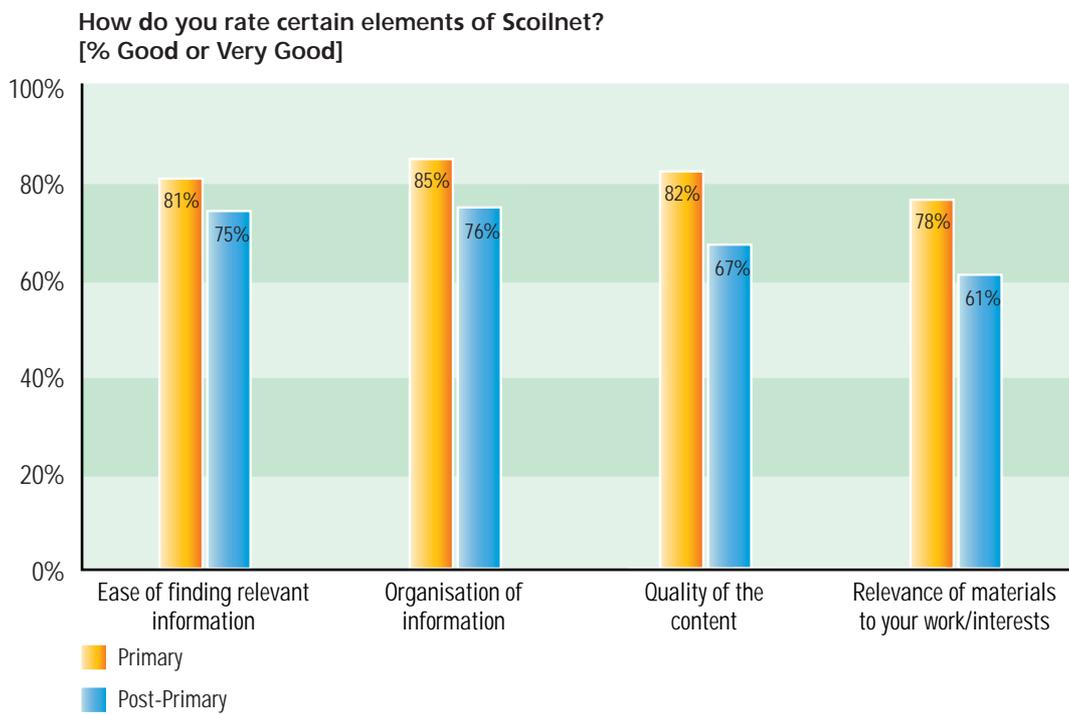


Base: All primary (n=859) and post-primary (n=532) teachers who used Scoilnet during the last two years

In general, Scoilnet achieved high ratings from those who visited it. Fig. 4.12 shows that 82% of the 858 primary teachers and 67% of the 531 post-primary teachers who rated the site stated that the quality of the site's content was either "good" or "very good." Furthermore, 78% and 61% of primary and post-primary teachers, respectively, rated the relevance of materials to their work or interests as "good" or "very good." Teachers of Mathematics and English at post-primary level rated Scoilnet more positively, while teachers of the applied science subjects rated it less positively. These teachers expressed disappointment with the relevance to their subject areas of the materials available on the site.



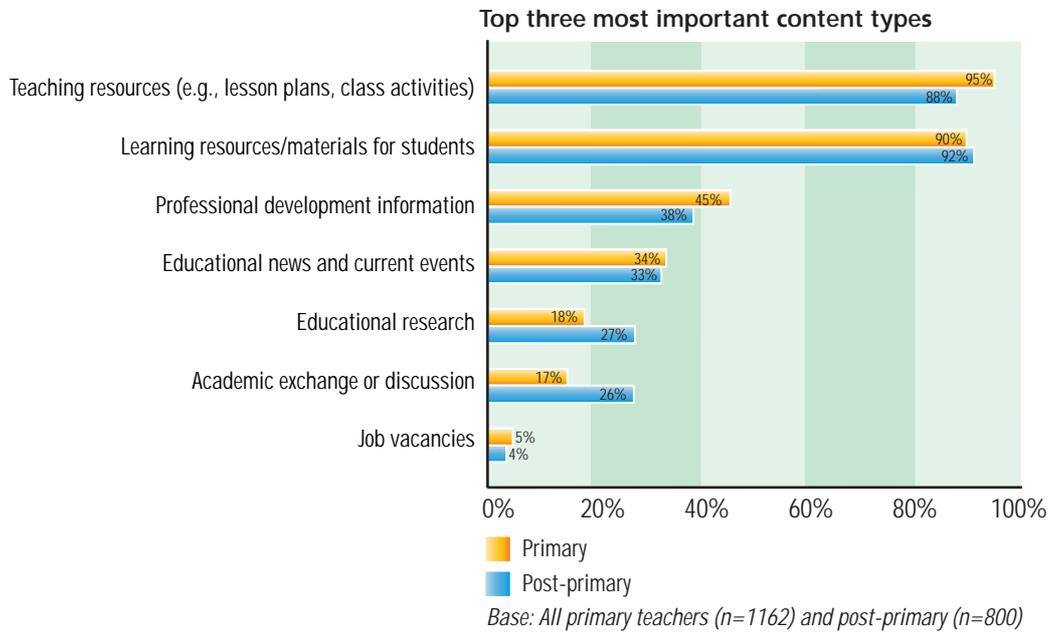
Fig. 4.12: Teachers' ratings of Scoilnet



Base: All primary (n=858) and post-primary (n=531) teachers who used Scoilnet during the last two years

Teachers were of the view that teaching resources (for example lesson plans and class activities) and learning resources and materials for use by students were important content items for Scoilnet. Fig. 4.13 provides details of the level of importance teachers attached to a range of content types.

Fig. 4.13: Teachers' views on what Scoilnet should contain



Teachers regarded class-planning materials (for example lesson plans and guidelines) as the most important type of teaching resource that Scoilnet should provide. Other teaching resources mentioned by primary teachers were assessment materials, classroom management information, and project ideas. The majority of other teaching resources mentioned by post-primary teachers were related to examinations (for example revision notes and activities, and marking schemes) and reviews of educational web sites (by subject). A low level of interest was shown in teacher-only forums as a teaching resource.

In general, the findings suggest that teachers are partial to using the internet to help them with their lesson preparation work, and that Scoilnet, and other such web sites, can act as a very helpful resource in this respect. It is equally clear, however, that a significant proportion of teachers do not exploit the benefits of the internet in preparing for their lessons. These include teachers over thirty-five, teachers who do not have ready access to appropriate ICT facilities, and teachers (at post-primary level) of certain subjects. Furthermore, of those who make use of the internet, for example for visiting such web sites as Scoilnet, their use is infrequent. It is clear that there is significant scope for the further development of the use of ICT in the area of lesson preparation. The continued efforts of schools at providing teachers with appropriate access to computers and the internet are considered good practice. It is also clear that teachers would like to see more teaching and learning resources being made available for downloading, and this is perhaps an area that could be reviewed by the NCTE.

4.3.3 Planning for using ICT in teaching and learning

While the use of ICT in planning for teaching and learning was prevalent in most case-study schools, planning for the actual use of ICT in the teaching and learning process was not universal, particularly in primary schools.⁵⁰ Where it did occur at post-primary level it was generally confined to a small group of subjects.

Inspectors reported frequently in the inspection reports on case-study primary schools that “individual teachers do not generally plan formally for the use of ICT in their classrooms,” or at best that “planning for [the] use of ICT appears to be incidental rather than formal.” There were a number of reasons for this particular lack of planning, not least being the lack of ICT facilities in classrooms or the lack of the ICT skills needed by teachers to integrate the technology effectively in their classroom practice. One report, for example, noted:

ICT is rarely mentioned in the lesson plans in terms of a discrete subject area or for skills development. ICT is more likely to appear in teachers’ lesson plans by way of reference to various software packages [applications] that support teaching and learning, including those that come with a textbook. It was indicated by the teachers interviewed that teachers’ knowledge and confidence in using ICT greatly influences the extent to which ICT features in their written preparation and the degree to which they use ICT in the classroom.

At post-primary level, inspectors commented regularly in a positive way on the extent of planning for the use of ICT in teaching and learning, but only in the case of certain subject areas. This was particularly strong among teachers of the science and applied science subjects and guidance counsellors. In one evaluation report it was mentioned that

in addition to having an input into the school’s ICT plan the teachers interviewed stated that they also planned for the use of ICT in their own classes. In this context the use of the internet as a source of animations, word processing to produce worksheets and CAD software were mentioned as resources, while reference was also made to the use of [careers software] with students.

In another post-primary school report reference was made to the fact that “informal training and collaboration is ongoing between teachers who plan for the use of ICT in their lessons,” and that “some of these work across subject divisions.”

It was also noted in case-study post-primary school evaluation reports that Transition Year, the LCVP and the LCA programme all encouraged increased planning for the use of ICT in teaching and learning.

Where limited planning for the actual use of ICT in teaching and learning was observed in schools, both primary and post-primary, it was common for inspectors to recommend that this area be developed. One primary school evaluation report stated:

⁵⁰ For example, only 43 % of the 127 mainstream teachers interviewed by inspectors during their visits to 77 schools reported that their planning showed how they intended to use ICT in their teaching. This compares with 69 % who reported that they used ICT to plan and prepare for teaching. In the case of the 71 members of special-education support teams interviewed, 57 % stated that their planning showed how they intended to use ICT in their teaching. This compares with 61 % who reported that they used ICT to plan and prepare for teaching.

Teachers reported that personal long-term and short-term planning does not include references to how it is intended using ICT to assist the teaching and learning process in the classes. This is an area that the teachers should include in future planning. As the number of students is small and the ratio of students to computers is generous (two students to one computer in the junior room and five students to one computer in the senior room) there is scope for the teachers to promote the use of ICT across a wide range of curricular areas using programmes tailored to meet the individual learning needs of the students.

Evaluation reports suggest that where there was ease of access to ICT hardware and software in classrooms more frequent use was made of these resources in teaching and learning. It was also clear from post-primary evaluation reports that teachers were more likely to use ICT in the teaching and learning of those subjects in which there was recent syllabus revision and consequent in-service support training. The use of the internet, word-processing programs and CDs distributed during in-service courses was frequently described. Teachers in the different case-study schools also reported that significant time and work were required to identify, find or generate appropriate subject-specific teaching and learning materials.

The fact that more teachers use ICT in their planning than plan for the actual use of ICT in their teaching suggests that teachers would benefit from training in teaching methods that incorporate ICT. This is an area where the NCTE and the relevant support services could assist schools, but it is also an area in which the ICT co-ordinator (or teachers who use ICT competently) can play a role.

4.4 Forward planning

The national surveys of both principals and teachers asked respondents to state what priorities they had identified with respect to the development of ICT in their school (in the case of principals) and their classrooms or subjects (in the case of teachers). The responses give an insight into the thinking and strategic planning in schools as they move into a future where students' daily environment outside school becomes increasingly dominated by computing technology.

4.4.1 Principals' priorities for ICT development

Through their questionnaire (and the case-study school evaluations) principals identified the following issues as important in relation to the development of ICT in their schools:

- the upgrade and maintenance of existing hardware (primary and post-primary)
- the integration of ICT in the curriculum (primary and post-primary)
- the provision of teacher training in ICT (primary and post-primary)
- the upgrade or provision of internet access and web site presence (primary).

Tables 4.4 and 4.5 provide samples of comments made by school principals in relation to their priorities for ICT development. When these are examined they give a good insight into the range of priorities that exist in schools, and into the commitment and far-sightedness of principals.

Table 4.4: Primary principals' views on the strategic development of ICT

School type and size	Comment from principal regarding priorities for development
Co-educational, large (200+)	Broadband; restoration of server after building work; refresher courses for teachers.
Co-educational, medium (100-199)	Computer for each teacher; broadband; school web site.
Co-educational, large (200+)	Encourage teachers to obtain and use material in a more structured way; encourage use of internet as a classroom tool, teachers' familiarity with IT.
Co-educational, large (200+)	Evaluation of current practices and procedures; provision of second computer to each classroom; further development of school web site.
Co-educational, medium (100-199)	Expand current provision to upgrade or replace some existing equipment; maintenance; networking and broadband completion; web site.
Co-educational, medium (100-199)	In-school in-service day; review ICT plan; update computers; networking; mobile projector.
Co-educational, large (200+)	Integration of ICT in various aspects of curriculum; provision of computer in each room.
Co-educational, large (200+)	More computers in classrooms; further integration of peripherals; broadband; networking; acquire digital projector; integrate ICT in curriculum.
Co-educational, large (200+)	One teacher with responsibility for ICT room; ICT curriculum; web site; maintenance.
Single-sex, large (200+)	Review general plan; acceptable-use policy; up-skilling; encourage greater use by all.
Co-educational, small (fewer than 100)	Staff training; broadband; networking; hardware replacement; support for special-needs students.
Single-sex, large (200+)	Teachers' skills; purchase of suitable software; timetabling of use of computer room.
Single-sex, medium (100-199)	Regular use of computer room; use of data projector as teaching tool; provision of laptop for each teacher.
Co-educational, large (200+)	Up-skilling of teachers; make more use of what's available.

Table 4.5: Post-primary principals' views on the strategic development of ICT

School type and size	Comment from principal regarding priorities for development
Vocational co-educational, large (600+)	Greater use of ICT when teaching subjects not specifically related to ICT; increased use of ICT as a teaching aid for special-needs students; provision of ICT facilities in every teaching area; expansion of ICT facilities in the school library.
Secondary co-educational, medium (400-599)	Development of acceptable-use policy; access to, and use of, computers and equipment; details of how ICT can be used to facilitate teaching and learning.
Secondary single-sex, medium (400-599)	Extend the network to all classrooms; provision of internet access in each classroom; further computers needed and another computer room.
Secondary single-sex, large (600+)	Promote use of the school's network (wired and wireless) by staff members; upgrade ICT skill levels of staff members; improve access to ICT facilities for all students; provide laptop computers to staff members and data projectors for each classroom.
Secondary single-sex, small (fewer than 400)	ICT support for students with special educational needs; in-service training for teachers using ICT in subject planning and classroom teaching; technical support in-service training; time and resources a continuing requirement.

Secondary single-sex, small (fewer than 400)	Integration in teaching and learning; extension of community access to ICT facilities; hardware replacement and maintenance.
Secondary single-sex, medium (400-599)	Increased access to ICT facilities for all students; increased use of ICT by all teachers throughout the curriculum; provision of training on site and continuous for staff members; making use of ICT the norm rather than for special events.
Secondary, co-educational, large (600+)	Greater use of ICT in the classroom as part of teaching and learning; provision of training and awareness for staff members; drafting of ICT policy; making larger number of computers available in classrooms and other teaching areas.
Secondary co-educational, small (fewer than 400)	Structure ICT courses so that each year group receives certification from an appropriate certification body at progressive levels as students' progress through school; connection of broadband and networking of as many classrooms as possible; professional development of teachers.
Community co-educational, large (600+)	Maintenance, access, software, administration; provision of hardware towards enhanced teaching and learning environment in classrooms.
Secondary co-educational, large (600+)	Upgrading hardware; teacher training; installing broadband; integrating computers in subject programme areas; finalising a written ICT plan.

4.4.2 Teachers' priorities for ICT development

Through their survey (and through interviews in case-study schools) teachers identified the following issues as important to them in relation to the development of ICT in their teaching:

- the provision of ICT in their classroom: hardware, software, broadband internet access (primary and post-primary)
- teacher training in ICT (primary and post-primary)
- updating of specific software, particularly for recently qualified teachers (primary)
- timetabling of ICT lessons (primary).

Table 4.6 outlines the priority areas identified by the 844 primary and 571 post-primary teachers who gave a response to this question.

Table 4.6: Teachers' priority areas for the development of ICT

Priority Area	Number of respondents reporting this area to be a priority		Proportion of respondents	
	Primary	Post-primary	Primary	Post-primary
Teacher training in ICT	170	80	20.1%	14%
Improved use of resources in teaching	154	34	18.2%	6%
Update or obtain (appropriate) software	153	82	18.1%	14.4%
Hardware or equipment	150	110	17.8%	19.3%
Integration of ICT in curriculum	127	26	15%	4.5%
Personal skill development	119	21	14.1%	3.6%
Teach ICT to students	106	5	12.6%	0.8%
Improved planning or timetabling	91	14	10.8%	2.5%
Internet	72	56	8.5%	9.8%
Facilitate access to ICT, especially in classroom	47	50	5.6%	8.8%
Information on or reviews of ICT	44	14	5.2%	2.5%
IT support	43	2	5.1%	0.4%
Provide or update computer room (primary)	18	15	2.1%	2.5%
Give access to computer room (post-primary)				

The main priorities of principals were infrastructural in nature, while teachers were more concerned with being able to effectively integrate ICT in their teaching. It is also encouraging to see that principals and teachers share some of the priorities identified regarding the development of ICT in schools, that is, the upgrading of equipment and professional development training.

4.5 Findings and recommendations

4.5.1 Main findings

ICT co-ordination in schools

- The responsibility for ICT in primary schools can lie with an ICT steering committee, the principal, the deputy principal, an ICT co-ordinator, or a combination of these personnel. At the post-primary level it usually lies with the ICT co-ordinator; all case-study schools had an ICT co-ordinator. ICT steering committees are not prevalent in schools.
- The evaluation found that greater efficiency was achieved where a named person had the responsibility for ICT within a school, and where their role was clearly defined. The duties of the ICT co-ordinator were not always clearly defined.
- Few ICT co-ordinators had opportunities to work with colleagues regarding relevant ICT pedagogical issues.

- The vision and commitment of the principal contributes significantly to the successful integration and development of ICT throughout the curriculum.

The ICT plan and the AUP

- The majority of primary schools (71% of survey respondents) have a written ICT plan, while fewer than half of post-primary schools (46%) reported having such a plan.
- The ICT plans tend to concentrate on hardware issues and their organisation rather than on how ICT can be used in the teaching and learning context.
- In those schools that engage in ICT planning there is a greater emphasis on whole-school ICT planning than planning for ICT by individual teachers.
- A variety of practices exists with regard to how schools develop and review their ICT plan. In most instances, however, teachers have opportunities to participate in the process. Few schools seek or receive support from their local ICT advisor.
- ICT plans in case-study post-primary schools revealed that limited planning existed with regard to dedicated ICT lessons. Best practice was observed where there were comprehensive plans that showed continuity and progression in students' work.
- Most schools have an AUP (83% and 87% of primary and post-primary survey respondents, respectively). This is a product perhaps of the requirements of the Schools Broadband Access Programme and the safety awareness-raising initiatives of the NCTE. It can also be taken as an indication of the seriousness that schools attach to the risks associated with use of the internet.

Continuing professional development

- Approximately 30% of primary schools and 57% of post-primary schools were found to have provided their staff with an in-school or external ICT training course within the last three years. Primary teachers prefer in-school training, while post-primary teachers expressed a preference for tutor-led courses in education centres.
- Teachers and principals have different priorities regarding the ICT professional development needs of staff members. Primary principals suggested courses in the use of digital imaging, in peripherals, and also in computer troubleshooting, whereas primary teachers suggested training in the use of software-specific applications in the classroom and the use of the internet and e-mail in teaching and learning. Post-primary principals, on the other hand, gave priority to training for teachers in specific subject areas and in the area of special educational needs. Post-primary teachers considered that training was required in the use of educational software, use of the internet in teaching and learning, and subject-specific use of ICT.

- Teachers who had attended new or revised syllabus in-service courses regularly, particularly post-primary teachers, commented that they had received little or no training in how to integrate ICT in their teaching in the subject concerned.

Scoilnet

- While relatively high proportions of teachers use Scoilnet, they do so infrequently. The majority of those who do use it, however, rate it highly. The more popular sections of the site include the teachers' resources and students' areas.
- Teachers would like to see more teaching and learning resources made available on the site for downloading.

ICT and teacher planning and preparation

- The majority of teachers use ICT in their lesson planning and preparation work, for example they use computers for preparing teaching materials and the internet for finding suitable teaching materials.
- Younger teachers are more likely to use ICT for their lesson planning and preparation than their more experienced colleagues.
- A higher level of use of ICT in lesson planning was found among teachers who had ready access to computer facilities and the internet.

Planning for the use of ICT in teaching and learning

- Fewer teachers plan for the use of ICT in teaching and learning than use it in their planning and preparation for teaching. Planning for its use in the classroom at the post-primary level varies considerably, depending on the subject being taught.
- The Transition Year, LCVP and LCA encourage increased planning for the use of ICT in teaching and learning. Teachers of these programmes regularly reported that their involvement also encouraged them to use ICT in their teaching with other class groups.

Priorities for ICT development in schools

- Principals and teachers in both primary and post-primary schools identified the provision and maintenance of hardware and the provision of teacher education in ICT as being strategically important with regard to the development of ICT in their school.
- Principals also felt that the further integration of ICT in the curriculum was important, while primary teachers felt that the updating of relevant educational software and the timetabling of ICT lessons for students were crucial.

4.5.2 Recommendations

Recommendations for policy-makers and policy advisors

- The NCTE and relevant support and advisory services should work more closely with schools to determine the training needs of staff members and to help them to organise appropriate training programmes. Particular attention should be given to organising training courses in teaching methods that incorporate ICT.
- School support services should include more examples of how ICT can be used to facilitate teaching and learning in any training programmes they provide. Furthermore, course organisers and presenters, when organising courses, should take account of the wide range of ICT abilities and experience commonly found in groups of teachers, employing strategies for working with mixed-ability groups.
- The contents of Scoilnet should continue to be developed with a view to making more teaching and learning resources available for downloading and to encouraging greater use of this resource by teachers.
- Consideration should be given to conducting a review of the LCVP, LCA and Transition Year with a view to learning lessons from these programmes with regard to how they have encouraged teachers to use ICT in their lesson planning and preparation and in their teaching. Consideration needs to be given at second level to extending the use of ICT for such work in other programmes and subjects.
- ICT co-ordinators in schools should be supported in setting up an association or network of ICT co-ordinators. This would act as a forum whereby co-ordinators could share information with one another, organise training, and engage with a community of practice and learn from others.

Recommendations for schools

ICT co-ordination in schools

- Schools should, wherever practicable, convene an ICT steering committee, which could assist in managing the development of their ICT plan and monitor and review its continuous implementation.
- One member of staff should take the lead in managing and co-ordinating ICT in a school. The duties of the co-ordinator, where appropriate, should be clearly defined and regularly reviewed and should include a significant emphasis on developing strategies for integrating ICT in the curriculum.

The ICT plan and the AUP

- Schools should have an ICT plan. The plan should be formulated by means of a consultative process involving teachers and relevant personnel (for example the ICT advisor) and should draw from guidelines provided by the NCTE and other support services.
- A school's ICT plan should emphasise the use of ICT in teaching and learning, rather than concentrating exclusively on the acquisition of equipment or on teachers' continuing professional development in ICT. Ideally it should include guidelines for teachers on setting out appropriate learning objectives for each class level in relation to the use of ICT in supporting the implementation of the curriculum.
- Schools should have an acceptable-use policy for computer hardware, software, and the internet. The AUP should be drawn up in consultation with all relevant stakeholders and should address all users of the technology.

Continuing professional development

- Schools should regularly monitor the ICT training needs of their staff and develop and implement training plans as appropriate. Training should concentrate on the integration of ICT in teaching and learning.
- Schools should consider liaising with the local education centre and relevant support services for the provision of specific courses on site, where possible. The clustering of small schools for the purpose of such courses might be explored in certain circumstances.

ICT and teachers' planning and preparation

- All teachers should exploit the benefits to be gained from ICT in their lesson planning and preparation. They could endeavour, for example, to make greater use of Scoilnet as part of their lesson preparation work.
- It is recommended that teachers plan systematically for the use of ICT in teaching and learning.
- Teachers (or subject departments in post-primary schools) should work in collaboration with their ICT co-ordinator in identifying and acquiring suitable software resources.



Chapter 5

ICT and teaching and learning in primary schools

Part 3

ICT and teaching and learning in schools



5.1 Introduction

This chapter deals with ICT and its contribution to teaching and learning in primary schools. It examines how familiar teachers are with the relevant technology and its applications by looking at their ICT qualifications and skills. The chapter then reviews the use of ICT in both mainstream and special-education settings and its use in assessment, drawing on information collated from 127 classroom observations made by inspectors during WSE inspections, national questionnaire returns made by principals, teachers and students, and inspectors' reports on thirty-two case-study schools.

The chapter continues by examining the nature of the impact that ICT has on teaching and learning in the classroom. In this regard the views of inspectors, principals, teachers and students are all explored. Finally, the chapter draws attention to factors that were found by the evaluation to contribute to the successful integration of ICT in classrooms, as well as those that tend to constrain its development.

5.2 Teachers' ICT qualifications and skills

The national survey of teachers showed that a relatively small proportion of primary teachers held a formal qualification in ICT. Approximately 4% of primary teachers had a postgraduate qualification in ICT in education, while a further 6% had other informal qualifications in ICT.⁵¹ The proportion of teachers with qualifications in ICT increased to 15% when other academic qualifications in ICT were included.⁵² The survey showed that 48% of all teachers studied a module in ICT as part of their pre-service preparation. This proportion was higher for teachers under the age of thirty-five (81%) than for teachers over thirty-five (14%). It may be assumed that teachers who have no formal qualification will have developed their ICT skills through personal interest or by availing of relevant professional development courses.

51 Informal qualifications refer to such courses as the European Computer Driving Licence (ECDL).

52 Other academic qualifications in ICT might include a BSc in computer science.

Teachers were asked to state their perceived level of proficiency in a number of important ICT skills areas.⁵³ An analysis of the responses to this question showed that the majority of teachers do not consider themselves proficient in a wide range of ICT skills and applications. In addition, the majority of teachers report their ability to use ICT-facilitated methods and to assess the potential of computer applications and the internet as low. The highest levels of proficiency were reported in word-processing, the internet, and e-mail. Table 5.1 shows that more than 60% of all teachers rated their proficiency as “intermediate” or “advanced” in each of these areas. The lowest levels of proficiency were reported for networking, data-logging, assistive technology software, and programming or scripting. In general, proficiency correlated with age: younger teachers (under thirty-five) reported higher levels of ICT proficiency and use than their more experienced colleagues. This probably reflects a growing emphasis in teacher education on developing the ICT skills of student teachers, as well as the impact of an increasingly technological society. In the light of the importance of ICT in promoting a wider range of teaching and learning methods, including inquiry-based approaches, the education departments in third-level colleges should consider giving further priority to the inclusion of ICT in the preparation of students for teaching various aspects of the curriculum.

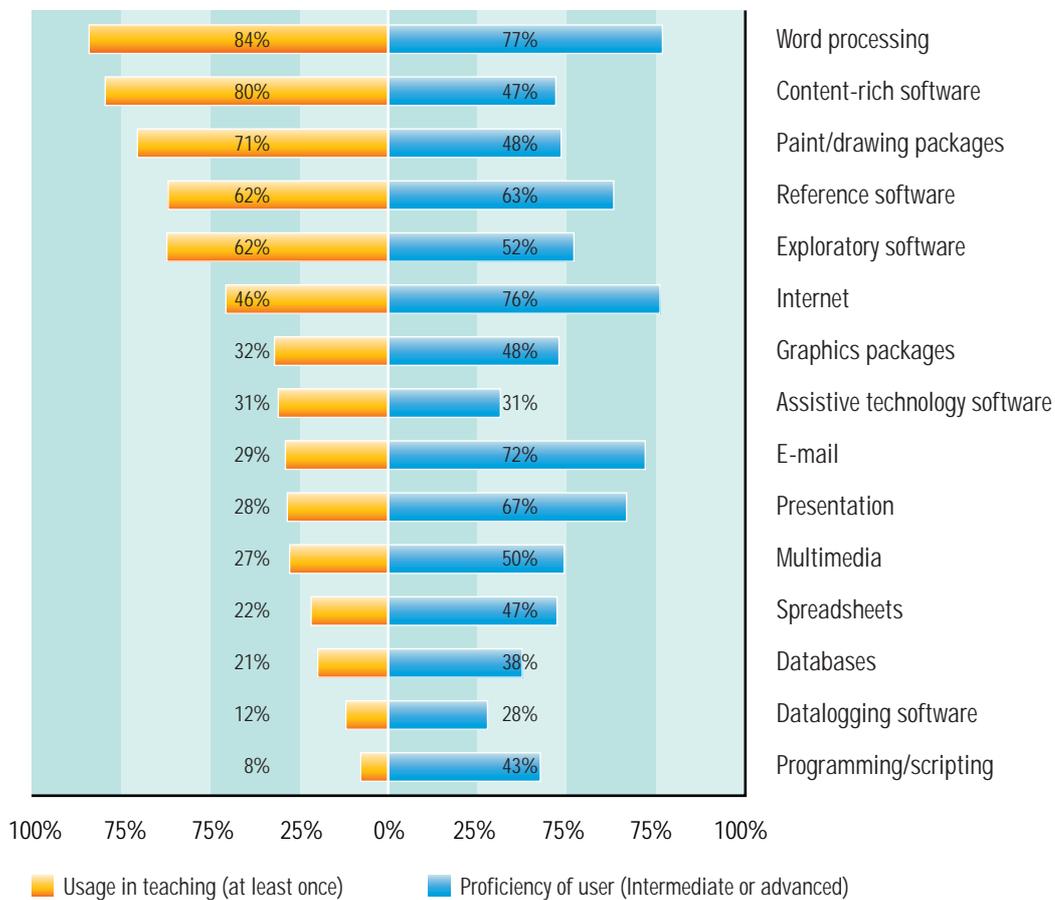
Table 5.1: Proportion of primary teachers who rated their proficiency in ICT skills as either “intermediate” or “advanced”

	Age			Gender		Total
	Under 35	35–45	Over 45	Male	Female	
Word-processing	79%	63%	48%	68%	67%	67%
Internet	83%	57%	42%	72%	67%	66%
E-mail	79%	53%	40%	71%	63%	63%
Reference software	52%	42%	33%	51%	44%	45%
Operating systems	48%	32%	21%	38%	39%	38%
Painting or drawing programs	45%	28%	23%	43%	35%	36%
File management	45%	30%	20%	47%	34%	35%
Exploratory software	36%	36%	27%	47%	32%	34%
Presentation	47%	23%	16%	39%	33%	33%
Content-rich software	37%	30%	29%	37%	33%	33%
Spreadsheets	35%	13%	13%	28%	24%	24%
Graphics programs	33%	17%	11%	32%	23%	24%
Multimedia	33%	12%	11%	31%	21%	23%
Troubleshooting	23%	13%	11%	26%	17%	18%
Databases	24%	10%	9%	24%	16%	17%
Assistive technology software	12%	10%	12%	16%	11%	11%
Programming or scripting	17%	7%	3%	14%	11%	11%
Data-logging software	13%	6%	5%	15%	9%	10%
Networking	10%	5%	3%	11%	7%	7%
n	569	270	281	155	893	1,162

53 Respondents were able to describe their level of proficiency in the different skills areas as “none,” “basic,” “intermediate,” or “advanced.”

However, when teachers' reported use of the relevant applications was correlated with their reported proficiency, as depicted in fig. 5.1, it was found that the level of proficiency was not reflected in actual use of the application. For example, the relatively low level of use of the internet and e-mail in classroom practice does not reflect teachers' reported high levels of proficiency in their use. Hence it can be assumed that other factors, such as individual teachers' motivation and access, influence the transfer of competence in individual applications to classroom practice.

Fig. 5.1: Use and related proficiency of applications in teaching



Base: Usage is based on teachers using applications in their teaching (n > 793)

Proficiency is based on teachers using applications in their teaching (n > 63)

When asked about their ability to use teaching and learning methods that are facilitated by ICT, 30% of primary teachers felt they had "intermediate" or "advanced" ability. Table 5.2 also shows that approximately four out of ten teachers reported that they had "intermediate" or "advanced" ability to assess the potential of educational software (40% of teachers) or internet material (41% of teachers) to facilitate teaching and learning. Younger teachers and male teachers were more

positive in the assessment of their abilities in all three areas. The SCR ratio had a negligible effect on teachers' self-assessment.

Table 5.2: Proportion of primary teachers who rated their ability in each of three ICT tasks that facilitate teaching and learning as either "intermediate" or "advanced"

	Age			Gender		SCR		Overall
	Under 35	35-45	Over 45	Male	Female	Low	High	
Using teaching and learning methods that are facilitated by ICT	38%	25%	20%	34%	29%	28%	32%	30%
Assessing the quality of educational software to support teaching and learning	46%	37%	27%	48%	38%	40%	41%	40%
Assessing the quality of internet material to support teaching and learning	50%	37%	26%	48%	40%	41%	41%	41%
n	569	270	281	155	893	533	534	1,162

The analysis also shows that teachers' competence is not of itself enough to ensure the transfer of that competence into practice. Obviously other factors, such as the availability of resources, teachers' motivation, and the school culture, will affect actual use in teaching and learning. If ICT is to be effectively integrated in teaching and learning it is clear that a holistic approach, embracing awareness-raising, professional development (pre-service, induction and in-service), planning, and infrastructure, will be required.

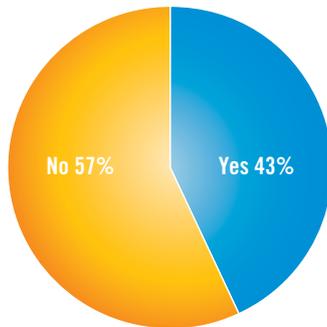
5.3 Classroom practice and ICT

5.3.1 Planning

Inspectors asked teachers during WSE inspections about their planning for the use ICT in their teaching. Some 43% of mainstream teachers, as shown in fig. 5.2, reported that their planning showed how they intended to use ICT in their teaching.

Fig. 5.2: Extent to which mainstream teachers plan for the use of ICT

Does your planning show how you intend to use ICT in your teaching?



Base: All mainstream class teachers (n = 127)

Of those teachers who showed how they intended to use ICT in their teaching, the main planning emphasis was on curricular areas (96%), followed by planning for the development of discrete ICT skills (74%), and the use of ICT to provide for students with special needs (56%). English was the most prominent curricular area for teachers who planned to use ICT in their teaching (94%), followed by Mathematics (64%). Teachers of senior classes were more likely than teachers of junior classes to plan for the use of ICT in the teaching of Science, History and Geography.⁵⁴ Slightly more than three-quarters (76%) of all teachers stated that their planning was based on the school's planning for ICT.

5.3.2 Frequency of ICT use

During their WSE inspections, inspectors distinguished between finding evidence of the use of ICT to facilitate teaching and learning in the classrooms visited and actual observation of the use of ICT during the inspection period.⁵⁵ Table 5.3 shows that inspectors reported evidence of ICT being used to facilitate teaching and learning in 59% of the 127 classroom observations carried out as part of WSE inspections. However, in only 22% of instances did they observe ICT being used in the classroom during an inspection period of approximately two hours. The differences between the indirect evidence of the use of ICT and the inspectors' first-hand observation of the use of ICT in teaching suggests that there is limited integration of ICT in the teaching and learning processes. Inspectors found evidence of higher levels of ICT use in senior classes (70% of classroom observations) than in junior classes (46% of classroom observations). This would suggest that the potential of ICT is not being fully realised in the critical early years of a child's development.

⁵⁴ Junior classes: infants to second class (inclusive). Senior classes: third class to sixth class (inclusive).

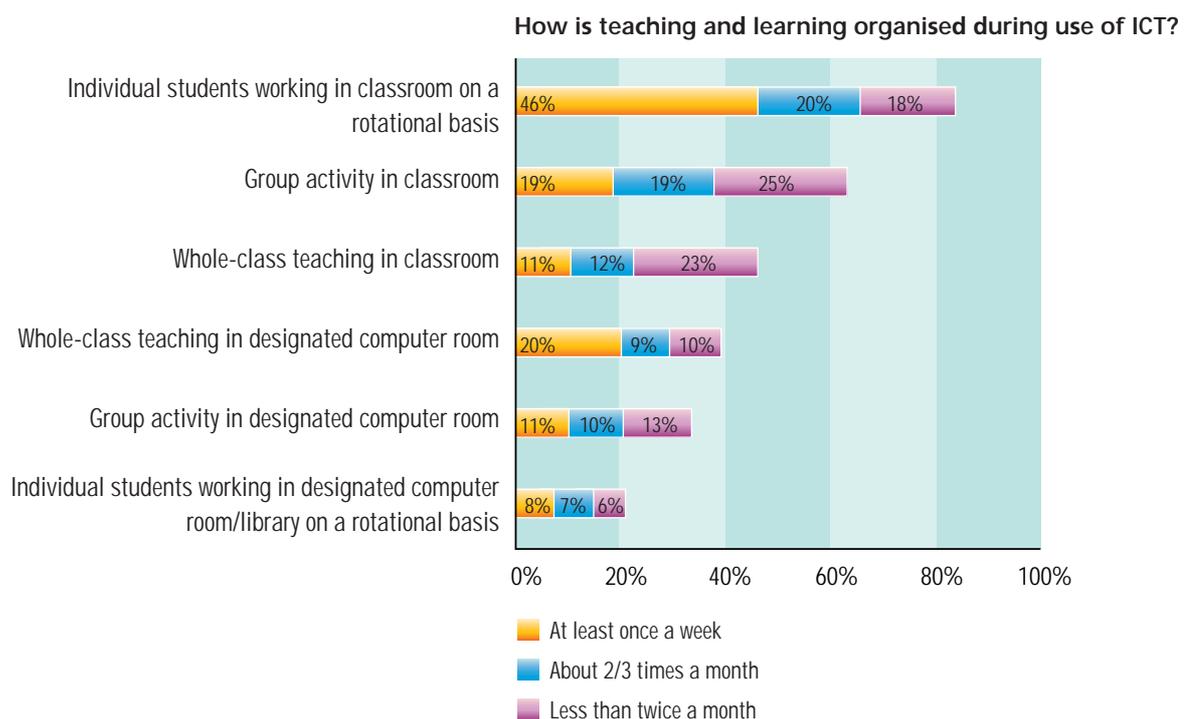
⁵⁵ Examples of such evidence include samples of pupils' work, displays of work involving ICT, and pupils' responses to questions posed by the inspector or teacher.

Table 5.3: Inspectors' observations on the use of ICT to facilitate teaching and learning in classrooms

	Class		SCR		Total
	Junior classes	Senior classes	Low	High	
Evidence of the use of ICT to facilitate teaching and learning	46%	70%	60%	62%	59%
Use of ICT observed in actual teaching and learning during the inspection period	20%	23%	27%	18%	22%
n	54	67	58	55	127

5.3.3 Organisation of ICT use

Inspectors who observed the actual use of ICT during inspection visits were asked to state how ICT activities were organised. It was found that the most frequently used organisational approach to the use of ICT in classrooms was one where the students used computers individually; this was followed by paired use and then whole-class use. Much of the individual ICT activity was organised in rotation. Similarly, respondents to the survey of teachers, as depicted in fig. 5.3, reported that the most frequently used approach was classroom activity in which individual students worked in rotation, followed by group activity and whole-class teaching in the classroom. In this instance, 46% of all primary mainstream and special class teachers reported that they organise the use of ICT in rotation at least once a week for individual students in the classroom.

Fig. 5.3: Organisation of teaching and learning during use of ICT

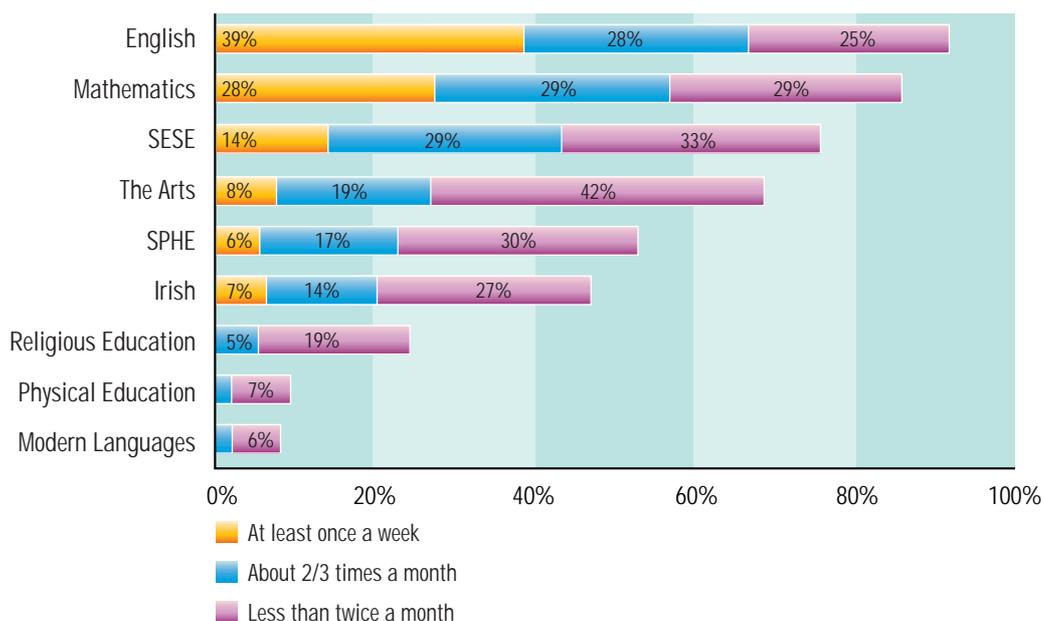
Base: All primary mainstream and special class teachers (n = 1026)

It could be assumed that this predominant use of ICT with individual students has a relatively low impact, given the likelihood that each student would have access to ICT for relatively short periods. However, it is positive that both paired and group approaches, as well as whole-class approaches, are used. The findings of the evaluation also give an insight into how teachers organise the use of ICT in accordance with specific school factors, such as the level of resources available. Individual or paired activity in rotation reflects a sensible use of resources in situations where resources are confined to a stand-alone computer (or computers). In this regard it is important that classroom organisational matters be emphasised in support materials and courses for teachers so that they can exploit potential opportunities for using ICT within the classroom, regardless of the resources available.

5.3.4 Focus of ICT use

The evaluation found that ICT, where used, predominates in core curricular areas, such as English and Mathematics, and Social, Environmental and Scientific Education (SESE), but that even this use of ICT is relatively infrequent. The national survey of teachers, as shown in fig. 5.4, demonstrated that ICT was used most frequently to promote learning in English. However, only 39% of these teachers used ICT in their teaching of English at least once a week. This weekly use was high relative to that for Mathematics and SESE, which had a weekly use of 28% and 14%, respectively. Furthermore, the case-study evaluations suggest that the use of ICT in the teaching of English, Mathematics and SESE is mainly to support and reinforce aspects of these subjects already taught.

Fig. 5.4: Frequency of ICT use to promote learning in curricular areas

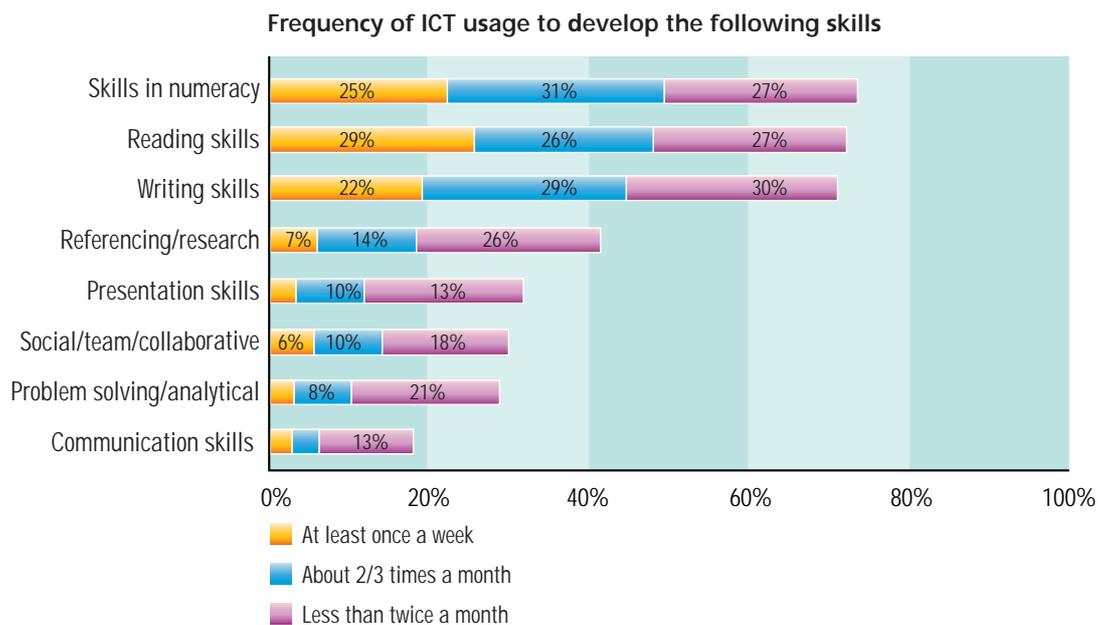


Base: All primary mainstream and special class teachers (n = 1026)

Both teachers and inspectors reported limited use, if any, of ICT in the teaching of other curricular areas. The low level of use in the teaching of Irish relative to the other core subjects is particularly disappointing given the potential of ICT as a tool in enhancing students' motivation to learn the language.

Teachers were asked in their national survey how frequently they used ICT to develop certain skills in their students. Fig. 5.5 shows that ICT is most frequently used to develop numeracy, reading and writing skills and less frequently to develop other important cross-curricular skills, such as research, presentation, social, problem-solving and communication skills. The use of ICT in developing reading, numeracy and writing skills, however, was infrequent, with fewer than 30% of teachers reporting using ICT at least once a week to develop these skills.

Fig. 5.5: Frequency of ICT use among mainstream and special class teachers to facilitate development of skills



Base: All primary mainstream and special class teachers (n = 1026)

In the course of WSE inspections, however, inspectors noted the prominent use of ICT to support the teaching of reading and writing. Furthermore, the case-study school evaluations showed that the use of ICT in reading and numeracy was mainly for the purpose of consolidating learning, and that the use of ICT for the teaching of writing was generally limited to presenting personal writing and writing for projects, with little emphasis on the writing process. The case-study evaluations showed that the development of research skills was conducted mainly in the context of SESE and looking-and-responding activities in the Visual Arts, while the use of ICT to develop discrete skills was concentrated on word-processing and typing skills.

The evaluation showed a degree of correlation between a school's SCR and the range of skills taught. An analysis of inspectors' observations during classroom inspections, for example, found that schools with a low SCR were more likely to teach presentation, social, team and collaborative skills or communication skills than schools with a high SCR. The use of ICT to develop numeracy and reading skills was more prevalent in these schools. Similarly, the survey of teachers found that those in schools with a low SCR were more likely to use ICT to develop most skills. In the questionnaires for students a slightly higher proportion of those in schools with a low SCR said that they learnt more about computers at school than those in schools with a high SCR.

The evaluation found a degree of progression in the development of ICT skills from junior to senior classes. Inspectors' observations during WSE inspection visits showed that ICT was used more prominently to develop writing skills and referencing, research and investigation skills in senior classes and to develop reading skills in junior classes. The survey of teachers similarly showed that teachers of senior classes were more likely to use ICT for writing purposes and referencing, research or investigation skills, while teachers of junior classes were more likely to use ICT to develop reading skills. A range of inspectors' reports on case-study schools showed a similar progression.

It is clear from this examination that the use of ICT is somewhat limited in primary schools, and that the potential for using ICT to develop critical life skills, such as communication, problem-solving and independent working skills, is not being realised. Evaluations of the implementation of the primary curriculum in recent years have also drawn attention to the deficit of provision in relation to the development of higher-order skills. The narrowness of the range of skills developed, particularly in the junior classes, is of concern, given that this is a critical time in a child's development. It is important that these students should have the same opportunity as those in senior classes to develop their presentation, research and higher-order skills through the use of ICT. There is a great need, therefore, to promote the development of these skills through ICT with regard to the implementation of the curriculum. The "Framework for ICT in Curriculum and Assessment" at present being developed by the NCCA will provide schools with advice in this area.

5.3.5 Use of resources and applications in the classroom

Software

The national survey of teachers explored the extent to which software was used to facilitate teaching and learning. In general, as shown in table 5.4, some 86% of teachers used software to facilitate teaching and learning. Teachers of senior classes were slightly more likely to use software to facilitate teaching and learning (90%) than teachers of junior classes (83%). A lower SCR tended to have a positive impact on the use of software to facilitate teaching and learning, with 89% of teachers in schools with a low SCR reporting such use, compared with 83% of those in schools with a high SCR. It was also found that the three most common sources of advice regarding the selection of applications for particular curriculum areas were colleagues (85%), educational software suppliers (52%), and the ICT advisor (29%).

Table 5.4: Teachers' use of software and the internet to support learning

	Class		SCR		Total
	Junior classes	Senior classes	Low	High	
Use of internet resources in planning and preparation for teaching	69%	74%	71%	67%	69%
Use of the internet in classroom practice	15%	37%	28%	20%	24%
Use of software to facilitate teaching and learning	83%	90%	89%	83%	86%
n	486	430	533	534	1,162

Case-study school evaluation reports emphasised the importance of software in facilitating the use of ICT in schools. A number of reports, for example, made explicit links between the availability of software and the extent to which ICT was used in a given school. The inspectors found widespread use of software resources in literacy and numeracy; however, they found that this was limited for the most part to consolidation (that is, reinforcing number facts and phonic skills), especially in junior classes and in the special-education setting. Apart from the use of software in SESE, case-study school evaluations found a dearth of software in use for other aspects of the curriculum.

Teachers of mainstream and special classes were asked in their survey to state which applications they used in their teaching in different curricular areas. Table 5.5 shows that the use of software predominated in the subject areas where ICT is used most frequently (that is, English, Mathematics, SESE, and the Visual Arts). The reliance on word-processing and the internet for other subjects, such as Irish, could be due to the relative lack of software available to support the use of ICT in those curricular areas, in contrast to that available for the other core areas.

Table 5.5: Most frequently used applications in the teaching of individual curricular areas

Subject	Application(s)
English	Word-processing or desktop publishing [page layout] and content-rich software
Mathematics	Content-rich software
Social, Environmental, and Scientific Education (SESE)	Reference software
Visual Arts	Painting and drawing programs
Social, Personal and Health Education (SPHE)	Word-processing or desktop publishing
Irish	Word-processing or desktop publishing
Religion	Word-processing or desktop publishing and internet
Physical Education	Internet
Modern Languages	Word-processing or desktop publishing and internet

Given the importance of software in facilitating the integration of ICT throughout the curriculum, there is a need to make primary teachers aware of the range of materials available in all curricular areas. It is also important that teachers are able to assess the potential of computer applications for use in their classrooms; developing this ability should be a central consideration in ICT training opportunities. As recommended by inspectors in the case-study school evaluations, schools should consider drawing up an inventory of computer applications in accordance with their suitability for class levels. Teachers also need to become more aware of the potential of other ICT applications, to become more competent in their use, and to engage in planning for their use in order that they can more fully integrate ICT in the teaching of the curriculum.

The internet

The survey of teachers asked them about their use of internet resources in planning and preparation for teaching and the use of the internet in classroom practice. As already seen in table 5.4, the internet was reported to be used as a resource in planning and preparation for teaching by 69% of all teachers. It was also found that such use was related to teaching experience, with recently qualified teachers being more likely to use internet resources in planning and preparation for teaching than their more experienced colleagues.

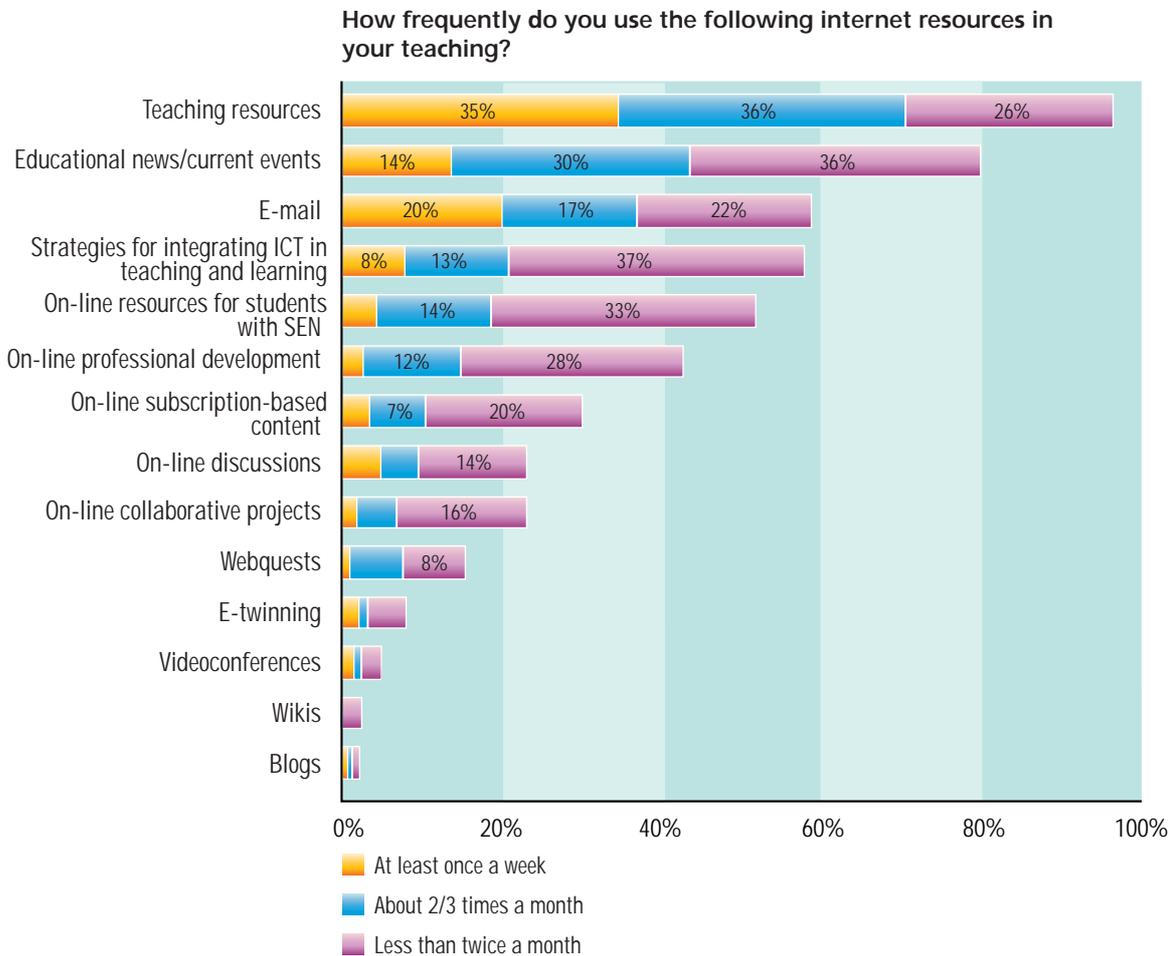
However, teachers' reported use of the internet in classroom practice was much lower than its use for planning and preparation. Only 24% of all teachers reported using the internet in classroom practice. The main reason for this difference was lack of internet access in the classroom, as cited by 58% of teachers. Presumably teachers have access to the internet outside school for the purposes of planning and preparation, while access within school is still somewhat limited. Other reasons reported by teachers for not using the internet in their classroom practice were lack of time (9%), lack of knowledge (9%), lack of computers (8%), and lack of suitability for children of this age (8%).

Teachers of senior classes were more likely to use the internet in classroom practice (37%) than teachers of junior classes (15%). A low SCR had a slightly positive impact on the use of the internet to facilitate teaching and learning: some 28% of teachers in schools with a low SCR reported using the internet in their classroom practice, compared with 20% of teachers in schools with a high SCR.

Those teachers who stated that they used the internet in their classroom practice (24% of all teachers) were also asked how frequently they used various internet resources. Fig. 5.6 shows the findings with regard to the use of internet resources in descending order of frequency of use.⁵⁶

⁵⁶ Any percentage on or below 5% is not labelled.

Fig. 5.6: Frequency of use of individual internet resources by internet users



Base: All primary teachers using internet in teaching (n = 275)

Of the teachers who used the internet in classroom practice, the most frequently used internet resources were teaching resources, educational news, information on current events, and e-mail. More than a third (35%) of all teachers using the internet used it at least once a week to obtain access to teaching resources.

In their visits to the thirty-two case-study schools inspectors found that teachers made very limited use, if any, of the internet in their classrooms. In many of these instances there was an expectation that the installation of broadband would greatly facilitate the use of the internet as a teaching and learning tool. Where the internet was used, activities included carrying out research activities (for example project work in SESE and Visual Arts) through the use of search engines and educational sites. One school used e-pal web sites for the development of students' communication skills. In another school, students had used interactive web sites in support of their science programme.

It is clear that the use of the internet by teachers in the classroom is limited (for the most part because of a lack of infrastructure), despite the fact that teachers themselves appear familiar with internet use, particularly in planning and obtaining access to resources and ideas for teaching. However, the practices observed in case-study schools, though engaged in on a limited scale, illustrate the potential for use of the internet in the classroom for developing such abilities as communication skills. Recent assistance to schools from the Department of Education and Science with regard to enhancing connectivity in schools should help to facilitate teachers in realising the potential of the internet.

Peripherals

Chapter 3 has already shown that there is little general use of peripherals, apart from printers, in primary classrooms. This is a cause of concern, given the role that the effective use of peripherals can play in the integration of ICT in teaching and learning, and the additional potential for their effective use in tandem with other ICT resources. For example, one inspector in a case-study school commented favourably on integrated ICT activity involving internet research, recording with a digital camera during field trips, and presenting findings using presentation software. Other inspectors commented favourably on the use of digital video recorders for the production of films.

It is clear that teachers need to be made more aware of the potential of software, the internet and peripheral resources and to become more confident in their use. This may be addressed in more focused ICT planning and enhanced training opportunities.

5.3.6 Quality of provision

The national survey of principals explored their views on how existing use of ICT in their school was benefiting teaching and learning. The comments of principals were mainly positive. They expressed the view that ICT is useful for motivating students, for consolidating their learning, for improving how they present their work, and for presenting an additional challenge. They also suggested that ICT motivates children, promotes imagination and creativity, and develops problem-solving skills. In general, 51% of the principals surveyed were of the view that using ICT contributed to improved ICT skills, while 34% felt that it contributed to improving class content and support of the curriculum.

Teachers also expressed positive attitudes in relation to the impact of ICT on teaching and learning. In the course of interviews in the case-study schools, teachers suggested a number of factors as having a positive impact in the classroom.

- The visual impact and interactive nature of ICT has a positive effect on students' motivation and levels of interest. It enhances their confidence, particularly those with special educational needs, and it increases students' enjoyment of learning.

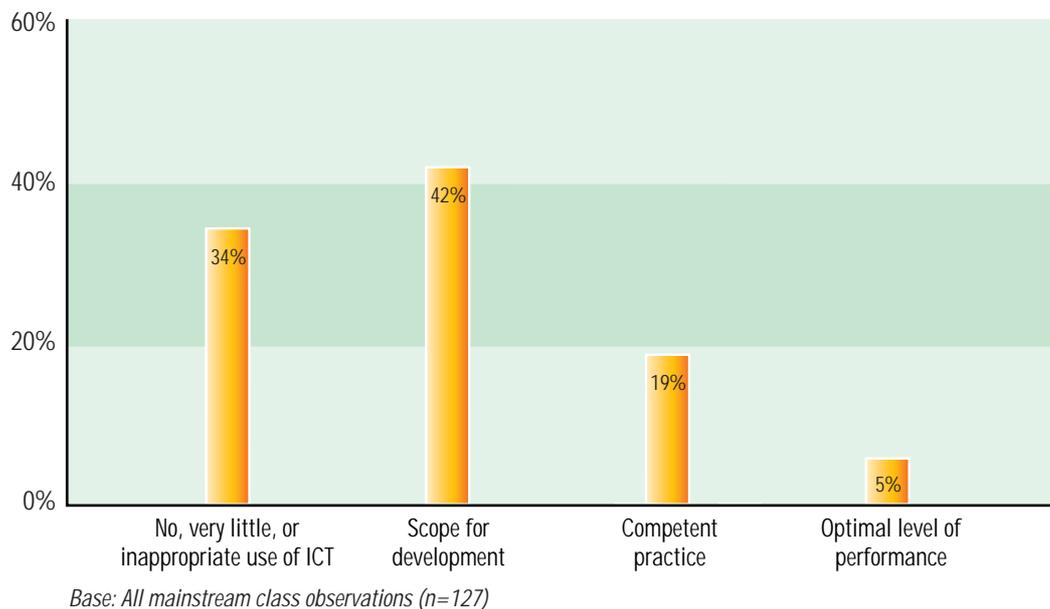


- ICT assists the development of good social skills in the classroom, the development of co-operation between students and teachers, and the promotion of peer tutoring in classrooms.
- ICT facilitates the development of students' recording and presentation skills, followed by independent and self-correcting skills and research and information retrieval skills.
- ICT is important in reinforcing and consolidating skills and learning.

However, while teachers, both at the principal and the classroom level, were generally quite positive about the role of ICT in teaching and learning in primary classrooms inspectors found that the undoubted potential of ICT was frequently unrealised. As noted earlier inspectors found relatively limited evidence of the integration of ICT in teaching and learning in the classroom, with, for example, the use of ICT in only 22% of classroom observations.

As well as frequency of use inspectors also reported on the quality of use of ICT in teaching and learning where it was observed during the inspection period in classrooms visited during WSEs. Fig. 5.7 shows that 34% of inspectors' reports on classroom observations reveal limited or inappropriate use, or no use, of ICT in teaching and learning. In 42% of instances the inspectors reported that there was scope for development, while in 24% of instances they reported a competent or optimal level of performance. The proportion of competent or optimal levels was higher for senior classes (30%) than for junior classes (15%).

Fig. 5.7: Inspectors' rating of the quality of use of ICT in teaching and learning



Inspectors also provided some commentary in relation to their rating of the quality of use of ICT in teaching and learning in the classroom. These comments point to a reliance on software for ICT use, and show that such factors as lack of planning and preparation constrain the effective use of ICT in classrooms and the systematic development of curricular skills using ICT. Table 5.6 provides a sample of these comments.

Table 5.6: Inspectors' comments on the quality of use of ICT observed in teaching and learning

Rating (class)	Inspector's comment
Very little use, or inappropriate use, of ICT (junior classes)	Discussions with the teacher reveal that ICT is used incidentally and for very short periods. Two programs were used intermittently, which are designed to enhance the students' literacy skills. The teacher uses the internet to research work occasionally. In general, the use of ICT in the classroom is incidental rather than being planned or systematic.
Scope for development (senior class)	The work the children were doing during the course of the evaluation was not adequately prepared, and they were simply transcribing from the screen. It is worth noting, however, that they did have the ability to operate the search engine to obtain access to information on the topic of their choice.
Competent practice (senior class)	Students are somewhat familiar with the use of Powerpoint as a medium of presentation but still need clear direction from the teacher and are clearly dependent on her to an extent in manipulating the computers in the room. The teacher uses Powerpoint in presentation.
Optimal level of performance (middle class)	Software on Ancient Egyptians: excellent stimulation of students, clarification of information and consolidation. ICT used in project work; also video and camcorder use.

Inspectors who visited case-study schools gave additional insights into the quality and range of ICT activity in primary schools. Many commented favourably on the attitude, enthusiasm and confidence of fifth-class students in using ICT, citing, for example, good use of relevant internet sites and reference software, both for project work and incidental research.

Other commendable practices observed by the inspectors in case-study schools included:

- the use of ICT to facilitate the writing process of drafting and redrafting and students' writing in a variety of genres
- the use of ICT in higher-order activities, such as the development of students' critical skills in looking and responding to art, the use of exploratory software to develop problem-solving skills and logic capabilities, and the use of spreadsheets
- the use of ICT to develop creative skills, such as drawing and design, listening and responding, activity in music, and construction skills (through the use of robotics)
- the use of the digital camera in producing group and class projects
- the use of ICT in teaching Irish poetry
- the use of ICT to create and to record musical compositions
- the use of databases for the collation, examination and presentation of data
- the use of computer-generated presentations by students to present their project work.

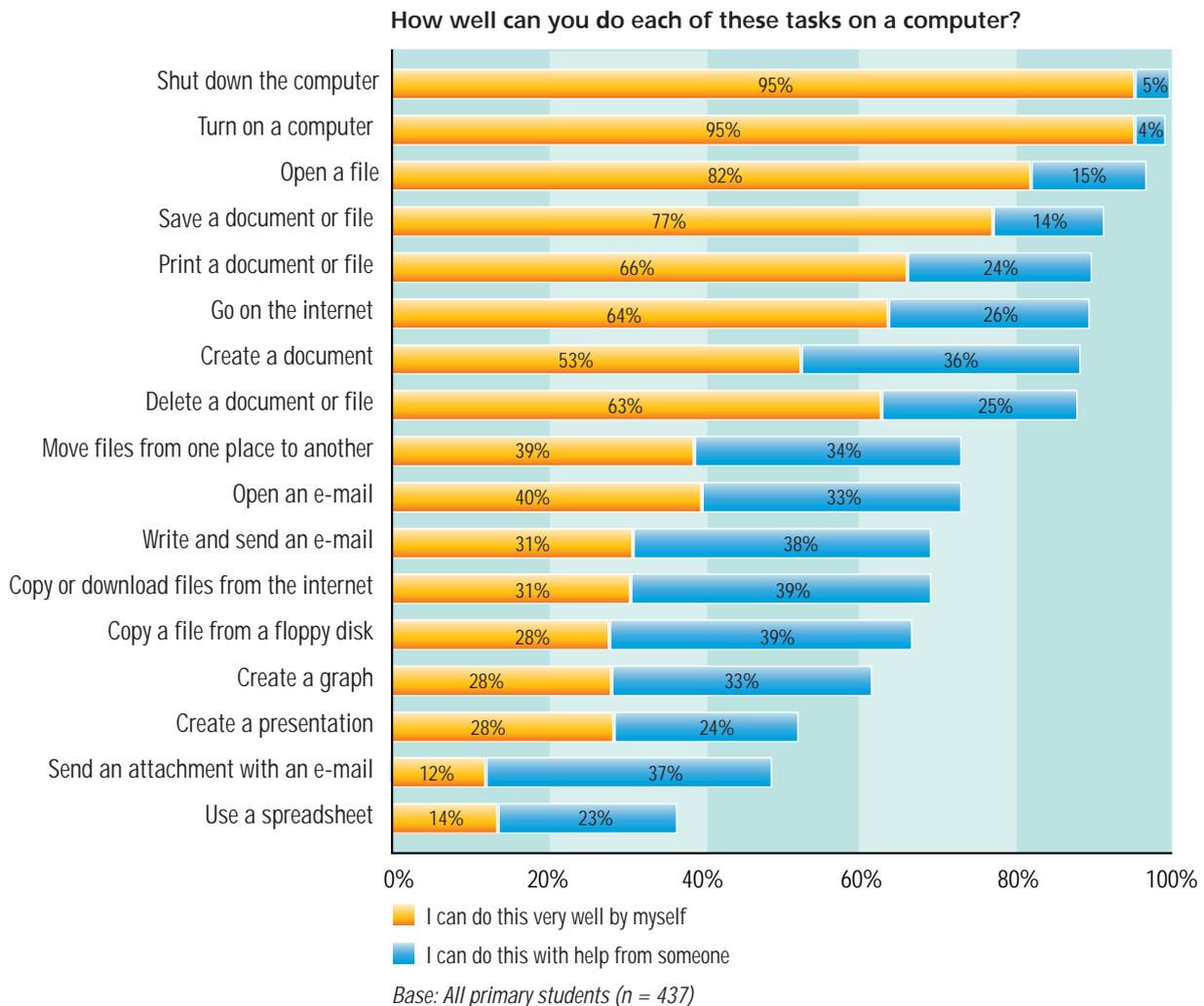


However, the inspectors found that the range of skills and knowledge displayed by students varied significantly among case-study schools, and that competence in the use of ICT was limited for the most part to basic ICT skills, centred on the use of word-processing for personal writing and project work. One inspector described this in the following terms:

A number of students in senior classes have developed some competency in ICT skills relating to the use of word-processing and the internet. They have also used the computer in the writing process and have access to content-rich mathematics and reading software. Students enjoy opportunities to paint and draw using the computer. Students are enthusiastic and confident in their discussion in respect of this relatively simple use of ICT.

Despite this emphasis on the development of basic ICT skills, the survey of fifth-class students showed, as illustrated in fig. 5.8, that many lack the competence to complete basic tasks on the computer. While most reported that they were able to perform many basic computer tasks, such as turning the computer on and off and opening or saving a file, more than 30% reported that they were not able to print a document or to go on the internet by themselves, while almost half (47%) reported not being able to create a document by themselves. The majority were unaware of how to create a presentation (72%), use a spreadsheet (86%), or send an attachment with an e-mail message (88%).

Fig. 5.8: Students' proficiency in individual tasks



Interestingly, more than four out of five students (82%) in the case-study schools who completed questionnaires stated that using a computer helped them with their schoolwork. This was mainly through the use of the internet for projects. Only 39% reported that they used their home computer for homework. A higher proportion of girls (87%) than boys (77%) stated that using a computer helped them with their schoolwork; this was primarily through typing stories, poems, and essays. Similarly, slightly more girls (43%) than boys (36%) stated that a computer helped them with their homework, again primarily for typing poems, essays, and stories.

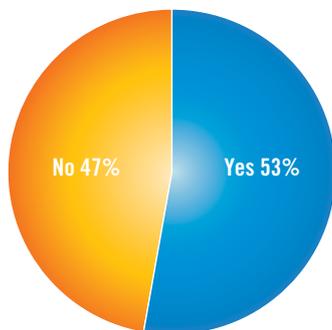
In general, it can be said that limited use is at present made of ICT in teaching and learning in primary schools. However, despite the constraints that inhibit the greater use of the technology, there are examples of its effective use that could be extended and built on through taking such steps as sharing good practice within and between schools.

5.3.7 Provision for students with special educational needs by mainstream class teachers

The evaluation found that the level of ICT used to assist students with special educational needs within mainstream classrooms is quite low, despite the fact that the great majority of classrooms have children who have access to additional support. As shown in fig. 5.9, 53% of teachers in the schools visited by inspectors during WSE classroom inspections reported that they used ICT to assist students with special educational needs. Of those who did, teaching and learning was primarily facilitated by a student working individually on a computer (64% of teachers). These teachers reported using programs and web sites to assist their students. Teachers of senior classes were more likely to use ICT to assist students with special educational needs in their class (63%) than teachers of junior classes (39%). Given the predominantly individualised nature of the ICT-related activity involved, this may be related to the greater ability of older students to work independently, compared with that of the younger students.

Fig. 5.9: Level of ICT support for students with special educational needs in mainstream classrooms

Do you use ICT to support students with special educational needs in class?



Base: All mainstream class teachers (n = 127)

However, in only 11% of classroom observations did the inspectors on WSE visits observe the use of ICT in mainstream classrooms to assist students with special educational needs. Similarly to what was reported by teachers, the inspectors observed that the use of ICT to assist students with special educational needs was highest for senior classes and was primarily organised individually.

The low level of ICT use with students with special educational needs in mainstream classrooms shows that the potential of ICT to provide a differentiated curriculum for those students is not being realised. There is clearly a need for teachers to become more aware of how to use ICT to differentiate work for their students. It is also of note that where children with special educational needs are given the opportunity to engage in ICT-related activity it is primarily as individuals. The potential for embracing paired or group activity in this regard could be further explored.

5.4 ICT in special education

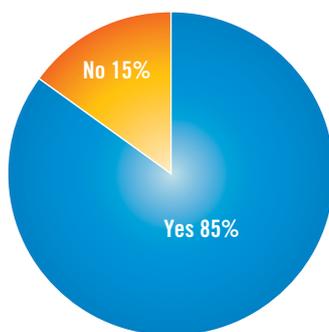
Over the past decade there has been a significant increase in the level of resources provided for students with special educational needs within mainstream primary schools. The evaluation attempted to gain an insight into the extent and quality of the use of ICT in special-needs education. This section of the report looks at the provision for children with special educational needs by members of the special-education support team.⁵⁷

5.4.1 Access to ICT

Inspectors on WSE inspections explored the level of access that students had to ICT in the special-education setting. Some 85% of the seventy-one members of special-education support teams interviewed in schools, as shown in fig. 5.10, stated that their students had access to ICT. Of those with access, 90% said that ICT activity took place in the special-education support setting. Half (50%) of all respondents said that teaching and learning using ICT was organised by individually working with students with special educational needs. Somewhat less than half (45%) of respondents said that a combination of individual and group or paired work was used.

Fig. 5.10: Level of access by students with special educational needs in special-education support settings

Do students have access to ICT in this context?



Base: All special education team members (n = 71)

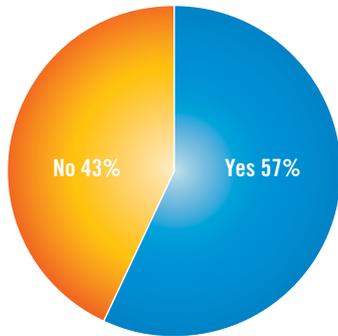
5.4.2 Planning for the use of ICT

Approximately 57% of the members of special-education teams interviewed by the inspectors on WSE visits, as illustrated in fig. 5.11, reported that their planning showed how they intended to use ICT in their teaching. Of those who displayed an intention to use ICT in their teaching, the main emphasis was on reading (92%), followed by numeracy (82%) and writing (56%). Some 60% of special-education support teachers who planned for the use of ICT in their teaching reported that this planning was based on the school's planning for ICT.

⁵⁷ Members of the special-education support team include the resource teacher, learning-support teacher and resource teacher for Travellers. It should be noted that, in accordance with Circular 02/05, learning-support teachers and resource teachers are now referred to as learning-support and resource teachers (LSRTs).

Fig. 5.11: Extent to which special-education support team members plan for the use of ICT

Does your planning show how you intend to use ICT in your teaching?



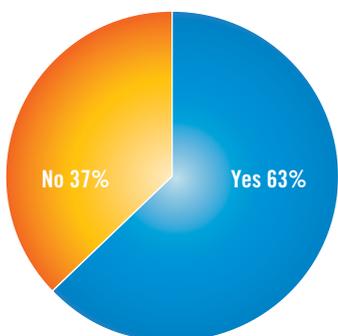
Base: All special education team members (n = 71)

5.4.3 Frequency of ICT use

Inspectors were asked to distinguish between evidence of the use of ICT to facilitate teaching and learning in the classrooms visited and actual observation of ICT in teaching and learning during the inspection period.⁵⁸ Fig. 5.12 shows that 63% of the inspectors reported that they saw evidence of the use of ICT to facilitate teaching and learning in these classrooms, while 42% observed ICT being used in teaching and learning during the inspection period. This use is much higher than the level of ICT use observed by inspectors to provide for mainstream students (24%) and students with special educational needs within mainstream classrooms (11%). Most ICT use by members of the special-education team was through individual work with the student (69% of instances).

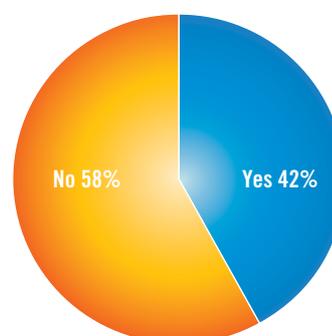
Fig. 5.12: Inspectors’ observations of the use of ICT to facilitate teaching and learning in special-education support settings

Is there evidence of the use of ICT to support teaching and learning?



Base: All special education team observations (n = 71)

Was use of ICT observed in actual teaching and learning during the inspection period?



Base: All special education team observations (n = 71)

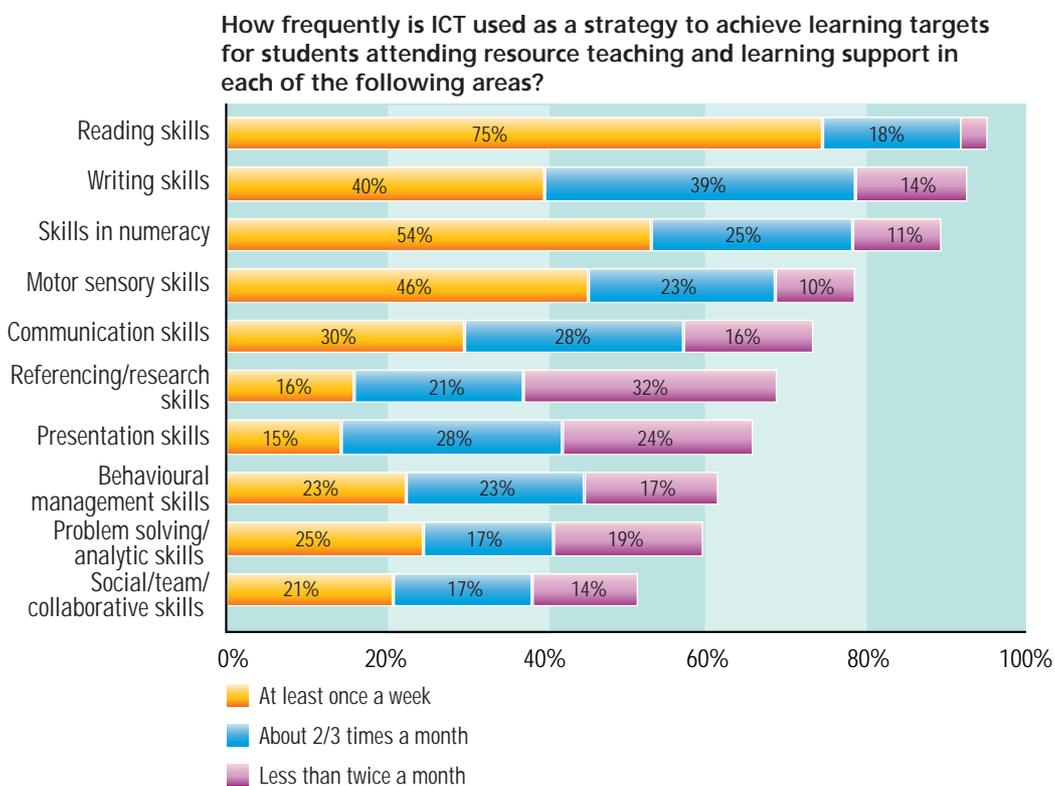
⁵⁸ Examples of such evidence include samples of pupils’ work, displays of work involving ICT, and pupils’ responses to questions posed by the inspector or teacher.

5.4.4 Focus of ICT use

The extent to which members of special-education support teams were using ICT to facilitate teaching and learning in a number of priority areas was explored as part of the evaluation. The special-education support teachers who responded to the national survey reported, as shown in fig. 5.13, that the main use of ICT in the special-education setting was for reading, numeracy, writing, and the development of motor sensory skills. Some 75% of these special-education teachers reported using ICT to develop reading skills at least once a week, which was far more frequent than that reported for writing skills (40%), motor sensory skills (46%), and numeracy skills (54%). The inspectors observing classroom practice during WSE inspections also found that the main skills being developed were (in declining order of frequency) reading, numeracy, and writing.

The evaluation found that there is a greater general range of skills development in the special-education support setting than in mainstream classrooms. While ICT is used much less frequently for the development of other skills, such as communication, referencing, presentation, and higher-order skills, the use of ICT for the development of these skills is still much more frequent than that reported for mainstream classrooms.⁵⁹

Fig. 5.13: Frequency of ICT use in special-education support settings to facilitate development of skills



59 This can be seen when fig. 5.5 and fig. 5.13 are compared.

In general, the relatively high frequency of use of ICT by members of the special-education support team to promote the development of literacy and numeracy is not surprising, given the priority attached to these core curricular skills in schools in this learning context. ICT facilitates a multi-sensory approach to the teaching of essential skills through the use, for example, of data projectors, speakers, and interactive whiteboards, and this should be exploited in special-education settings wherever appropriate.

5.4.5 Use of resources and applications

The survey of teachers explored the degree to which different applications were used in the development of a range of special educational needs priority areas. Members of the special-education support teams, as illustrated in table 5.7, were found to use applications most frequently for the development of reading and writing skills.⁶⁰

Table 5.7: Applications used by members of special-education support teams to promote the development of skills

	Reading	Writing	Numeracy	Presentation	Motor sensory	Communication	Problem-solving and analytical	Referencing and research	Social	Behavioural management
Content-rich software	72%	37%	84%	15%	51%	46%	83%	16%	50%	44%
Word-processing	67%	89%	25%	74%	63%	61%	16%	13%	37%	25%
Reference software	30%	10%	5%	11%	10%	16%	28%	71%	9%	16%
Painting and drawing programs	8%	12%	5%	40%	40%	15%	5%	4%	15%	31%
Internet	19%	4%	8%	12%	5%	18%	16%	45%	24%	6%
Assistive technology software	26%	18%	16%	11%	21%	23%	7%	4%	7%	16%
Presentation	16%	16%	0	26%	6%	18%	0	5%	13%	9%
Graphics programs	7%	11%	1%	21%	2%	13%	2%	9%	15%	6%
Multimedia	7%	6%	3%	11%	6%	13%	4%	4%	13%	0
E-mail	6%	7%	3%	4%	2%	16%	2%	13%	13%	0
Spreadsheets	2%	1%	6%	6%	0	2%	5%	11%	0	3%
Other	4%	1%	3%	0	3%	2%	2%	2%	2%	3%
Databases	2%	0	1%	1%	0	5%	0	4%	0	3%
Programming or scripting	0	0	1%	0	3%	0	0	2%	2%	0
n (valid)	110	103	80	73	67	61	57	56	46	32

⁶⁰ Care should be taken when interpreting the percentages from this table, as sample sizes are low. Only 14 % of respondents were considered to be support teachers.

Furthermore, table 5.8 reveals that those members of special-education support teams surveyed made prominent use of word-processing and content-rich software to facilitate teaching and learning in the different priority areas.

Table 5.8: Most frequently used applications to promote the development of individual learning priority areas

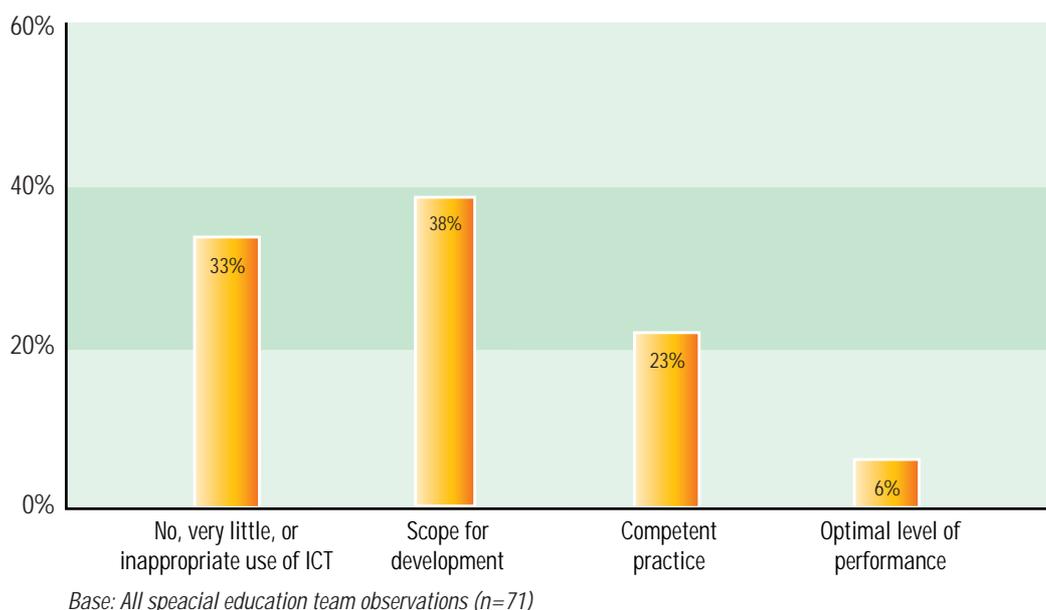
Skills	Applications
Reading skills	Word-processing, content-rich software
Writing skills	Word-processing
Numeracy skills	Content-rich software
Presentation skills	Word-processing, painting and drawing programs
Motor sensory skills	Word-processing, content-rich software, painting and drawing programs
Communication skills	Word-processing, content-rich software
Problem-solving skills	Content-rich software
Referencing and research skills	Reference software
Social skills	Content-rich software
Behavioural management skills	Content-rich software

However, this reliance on content-rich software and word-processing suggests that the full potential of ICT is not being realised in special-education support settings. Teachers should explore the possibility of making greater use of other applications such as exploratory, reference and assistive technology software with students with special educational needs

5.4.6 Quality of provision

Inspectors were asked to describe the quality of ICT in special-education support settings during WSE evaluations. Their observations on the quality of use of ICT in teaching and learning, as illustrated in fig. 5.14, show a range of quality in provision. A third of the observations reveal very little or inappropriate use, or no use, of ICT in the classroom. Another 38% of the observations reveal scope for development. Approximately 29% of the observations stated that there was a competent or optimal level of performance in the special-education setting. The proportion of observations rated “competent” or “optimal” was higher (36%) for schools with a high SCR.

Fig. 5.14: Inspectors' ratings of the quality of use of ICT in teaching and learning observed in special-education support settings



Inspectors' ratings of the quality of use of ICT in teaching and learning in special-education support settings are comparable, for the most part, with ratings on the use of ICT in mainstream classes. However, as table 5.9 shows, slightly more special-education support settings were allocated a "competent" or "optimal" rating (29%, compared with 24%).

Table 5.9: Comparison of inspectors' ratings of the quality of ICT provision in supporting children with special educational needs in mainstream and special-education support settings

	Mainstream settings and special classes	Special-education support settings
Very little or inappropriate use	34%	33%
Scope for development	42%	38%
Competent or optimal use	24%	29%

Inspectors also provided some comments on the quality of use of ICT in teaching and learning in the special-education support context in line with their ratings. These comments, a sample of which are provided in table 5.10, suggest that quality of provision is mainly constrained by lack of resources, lack of planning and timetabling, and lack of competence on the part of teachers. The accessibility of such resources as computer applications would appear to be an important factor influencing provision. Where competent practice was identified, the inspectors drew attention to the integration of ICT in learning and the learning benefits that accrue from ICT-related activity.

Table 5.10: Sample of inspectors' comments on the quality of ICT use in special-education support settings

Rating	Comment
Very little use, or inappropriate use, of ICT	There is potential for more frequent and structured use of ICT to support the development of students' literacy and numeracy skill. While a laptop computer has been purchased to support the work of learning support, it was not available or in use in the classroom during the inspection period. It is mainly used to support teachers' planning and preparation.
Scope for development	The activity noted took the form of games only. The work was done independently, with little verbal interaction between teacher and student to ascertain whether understanding was deepening.
Competent practice	Teacher has a broad range of software to support her work with individual students and groups of students in a learning-support role. Hardware and software positioned in a very easily accessed corner.
Optimal level of performance	Excellent work done, where ICT is an integral part of the teaching and learning that takes place. A wide range of software used, and the work done is very well integrated in all curricular areas.

Inspectors' reports on case-study schools suggest that there are some good practices in the use of ICT to support children with special educational needs, but that these are not widespread. For example, inspectors commented favourably on effective use of ICT to promote creative writing, the development of project skills, independent learning, social skills, and co-ordination or motor skills. The use of creative writing software was also reported as a useful means of managing the teaching of a range of abilities within a group.

In general, it is clear that there are some good practices in ICT use to facilitate teaching and learning in special-education settings but that there is also significant room for development.

5.5 Assessment

While the evaluation found some evidence of administrative use of ICT by teachers during the assessment of students, it found limited evidence of teachers engaging in the assessment of ICT-related activity and its impact on teaching and learning. More than two-fifths (42%) of teachers interviewed as part of classroom inspections during WSEs said that they used ICT to record students' progress. Only 12% of respondents in the survey of teachers, however, reported that they had attempted to assess the impact of ICT on teaching and learning. Of the teachers who attempted to assess the impact of the use of ICT on teaching and learning in the class, 46% reported using observation, while 22% reported using an assessment test. An analysis of inspectors' reports on case-study schools also illustrates the lack of attention to assessment of students' progress in ICT-related activity throughout the curriculum.

It is clear that very little assessment of ICT-related activity takes place in primary school classrooms, which is critical, given that assessment, followed by planning, is the starting-point for improving the use of ICT in teaching and learning. Recent evaluations of the implementation of the curriculum reveal that this lack of attention to assessment is not confined to ICT. The ICT framework from the NCCA should help to address this deficit with regard to assessment of the use of ICT in the curriculum. However, given the difficulties that teachers have with assessment, it is very important that training be provided to facilitate the effective use of the framework and its assessment mechanisms.

5.6 Developing ICT in the classroom

The evaluation identified factors that both constrain and facilitate the development of ICT in primary classrooms. It is important that schools take account of these issues and work towards overcoming the constraining factors and building on those factors that contribute to the development of ICT.

5.6.1 Factors that constrain the development of ICT in the curriculum

In their reports on case-study schools, inspectors commented on the factors that constrained the development of ICT in schools. The main factors related to poor infrastructure and lack of technical support, low levels of competence and confidence on the part of teachers, insufficient time and funding, and planning-related issues. Respondents in the survey of teachers also reported infrastructural issues and lack of time as factors constraining the use of ICT in teaching and learning.

5.6.2 Factors that facilitate the development of ICT in the curriculum

The most prominent factors facilitating the development of ICT in the curriculum include the knowledge, enthusiasm, competence and experience of the teacher. The availability of appropriate and accessible professional development clearly has a critical role to play in developing teachers' skills and confidence in the use of ICT. While teachers' attitudes and competence are crucial, it is also essential that they have ready access to functioning hardware and appropriate software. In this regard, access to the internet and the availability of suitable peripherals are important factors in facilitating the development of ICT in the classroom.

In the responses to their survey, teachers emphasised the ready availability of quality hardware in sufficient quantity as a central factor. An analysis of the responses to this survey also suggests that more experienced teachers gave priority to teacher training in ICT, while younger teachers gave priority to the improved use of existing hardware and software in teaching and the updating of specific software.

Adequate funding is clearly an issue in relation to the provision of resources, including both hardware and software. The grants provided to schools by the DES were recognised by teachers as making a significant contribution to the development of their school's resources. However, as reported in chapter 1, schools find it necessary to supplement these grants through fund-raising and other local contributions. As the availability of resources continues to be a constraining factor on the development of ICT in schools, it must be concluded that additional funding for the development of schools' ICT infrastructure is required.

5.7 Findings and recommendations

5.7.1 Main findings

Teachers' confidence and competence in the use of ICT

- Only 30% of primary teachers rated their ability either "intermediate" or "advanced" with regard to using teaching and learning methods that are facilitated by ICT. Younger or more recently qualified teachers had a higher perception of their ICT skills than more experienced teachers.

Incidence of ICT use

- At primary level, inspectors reported evidence of the use of ICT to facilitate teaching and learning in 59% of classroom observations carried out as part of WSEs. However, they observed ICT actually used in only 22% of the lessons observed.

Integration of ICT in teaching and learning

- ICT is mainly used for the development of students' writing, reading and numeracy skills. However, even this use of ICT is infrequent.
- There is limited integration of ICT in the classroom. Where it is used, ICT predominates in core curricular areas, such as English and Mathematics, and SESE
- There is limited use of ICT for the development of higher-order thinking skills, creative skills, social skills, independent working skills, and communication skills.
- Students in junior classes experience a narrower range of ICT activity than their counterparts in senior classes.
- Greater use is made of individual approaches to ICT-related activity than of paired, group or whole-class approaches.

- The evaluation found limited evidence of teachers engaging in the assessment of ICT-related activity in their classrooms or of its impact on teaching and learning.

Students' ICT use and competence

- Most students reported being able to perform many basic computer tasks, such as turning a computer on and off or opening and saving a file.
- More than 30% reported that they could not create a document, print a document, or log on to the internet, or would need help to do so.
- The majority of students did not know how to create a presentation, use a spreadsheet, or send an attachment with an e-mail message.

Use of resources

- There is a reliance on computer applications in both mainstream and special-education classes to facilitate the use of ICT in teaching and learning. This use is mainly for the consolidation of numeracy and literacy skills.
- While 69% of teachers reported using internet resources in planning and preparing for their teaching, fewer than a quarter (24%) use the internet in classroom practice.
- There is very limited use of peripherals in primary schools, apart perhaps from the printer.

Quality of provision

- Inspectors were asked to describe the quality of the use of ICT in the teaching and learning they observed during the inspection period in classrooms visited. Only a quarter of inspectors' reports on classroom observations suggest a competent or optimal level of performance. This proportion was higher for senior classes than for junior classes.

Special-education settings

- Approximately half the mainstream teachers reported using ICT to assist students with special educational needs in mainstream settings. A significantly higher use was reported by members of schools' special-education support teams.
- ICT is mainly used in special-education settings to develop reading, writing and numeracy skills, with the most common applications used being word-processing and content-rich software.
- Inspectors' observations of the use of ICT during classroom inspections suggest a range of quality of provision in special-education settings, with only a third of instances rated "competent" or "optimal."

Factors constraining the use of ICT

- Factors constraining the development of ICT in the curriculum include poor infrastructure and technical support, lack of competence or confidence on the part of teachers in the use of ICT, and funding.

Factors facilitating the development of ICT

- Factors facilitating the development of ICT in the curriculum include knowledge, competence and experience on the part of the teacher and access to functioning hardware, as well as funding.

5.7.2 Recommendations

Recommendations for policy-makers and policy advisors

Teachers need to be supported in meeting the challenge of effectively integrating ICT in their classroom practices so that Irish classrooms can be placed at the forefront of advances in teaching practices and students' learning techniques. This can be done in the following ways:

- Consideration should be given to ensuring that teachers are provided with opportunities to develop skills that are directly applicable to the use of ICT in the classroom. This should be addressed in a strategic way through a combination of pre-service, induction and in-service training methods.
- It is critical that teachers receive training in how to engage with the forthcoming "Framework for ICT in Curriculum and Assessment" to be published by the NCCA.
- Education departments in third-level colleges should consider giving priority to the integration of ICT in the different curricular areas when preparing students for teaching.
- It is important that classroom organisational matters be emphasised in support materials and courses for teachers so that they can exploit potential opportunities for using ICT in the classroom in accordance with the resources available.

Recommendations for schools

Teachers' confidence and competence in using ICT

- Schools should endeavour to adopt mechanisms to facilitate the sharing of good practice among members of the staff. For example, teachers who make effective use of ICT could act as mentors to colleagues who are not as confident in their use of the technology.
- Teachers should be encouraged to become more critically reflective of their classroom practice, particularly their practice with regard to ICT.

Integration of ICT in teaching and learning

- Schools should endeavour to provide all their students with an appropriate and equitable level of experience of ICT at all class levels.
- Continuous efforts should be made in schools to develop the level of teachers' access to ICT equipment. The provision of internet access in classrooms and access to a school network should be a priority for schools. The relevant DES grants will help facilitate this provision.
- Teachers should regularly review their use of ICT with a view to expanding their repertoire of teaching strategies, including opportunities for students' engagement with the technology.
- Schools and teachers should make greater use of ICT to differentiate the implementation of the curriculum within the mainstream classroom.
- Teachers should fully exploit the potential of ICT to facilitate the development of students' literacy and numeracy skills.
- Teachers should exploit the potential of ICT to develop a range of skills in students, including research and collaborative skills, creative writing skills, communication skills, and the higher-order skills of analysis, evaluation, and problem-solving.

Resources

- Schools should explore the use of as wide a range of resources and applications as possible, including educational software, peripherals, e-mail, presentation software, Scoilnet, the NCTE web site, and the internet. Schools could consider drawing up an inventory of software in accordance with its suitability for class levels and curricular applications. The NCTE's Software Central web site, which provides advice and support to teachers on the use of software in their classrooms, is a useful resource in this regard.

Special-education settings

- In using ICT as a teaching aid for students with special educational needs, schools should endeavour to ensure that it is being used to support the widest range of students' needs possible, both within classrooms and in withdrawal settings.
- Schools should exploit the benefits of ICT in their assessment procedures and practices beyond purely administrative functions. This could include using ICT to assess, track and analyse students' progress, using appropriate applications.



Chapter 6

ICT and teaching and learning in post-primary schools



6.1 Introduction

This chapter deals with ICT and its contribution to the teaching and learning process in post-primary school classrooms. It begins by looking at teachers' ICT qualifications and skills as a means of exploring the level of their familiarity with the relevant technology and its applications. It also looks at the present extent of students' use of ICT as a means of determining their ICT skill levels.

The chapter then turns to addressing how ICT is used at present in classrooms. Firstly, the nature of dedicated ICT lessons is examined. A number of areas are examined in detail, including the support that school principals give to the use of ICT in the classroom, the extent of ICT facilities in classrooms, the focus, organisation and frequency of its use, teaching activities that incorporate ICT, the extent of its use in different subjects, the quality of its provision, and its impact on the teaching and learning process. The use of ICT in special education settings and in assessment are also considered. Finally, the chapter identifies factors that contribute to the successful integration of ICT in classrooms, as well as those that tend to constrain its development.

6.2 ICT qualifications and skills

This section examines teachers' ICT skills and qualification levels as well as students' ICT skills levels. It draws primarily on the findings of the national surveys of teachers and students.

6.2.1 Teachers' ICT qualifications and skill levels

An analysis of the survey of teachers showed that approximately 6% of post-primary teachers had a postgraduate qualification in ICT in education, while a further 12% had other informal qualifications in ICT.⁶¹ The survey showed that teachers of Business Studies (33%), science subjects (26%), Mathematics (25%) and the applied science subjects (24%) were most likely to have such qualifications.

When other academic qualifications in ICT are included, a substantial 25% of all post-primary teachers reported having a qualification in ICT.⁶² Of the 737 teachers who reported that they had the higher diploma in education (HDipEd), only 213, or 29%, reported that they studied a module in ICT as part of this qualification; this increased to 60% of all teachers under the age of thirty-five.

This higher figure for younger teachers would seem to suggest a growing shift on the part of teacher educators to equipping trainee teachers with the necessary ICT skills to enable them to use ICT as part of their teaching methods in the classroom. This shift is perhaps in response to, among other things, the wider repertoire of teaching methods that ICT makes possible, to the impact that it can have on teaching and learning, and to the pervasiveness of ICT in schools. Teacher education departments in third-level colleges should consider giving priority to the study of a module on ICT in education for students following a postgraduate diploma in education course. Indeed the study of ICT in education should be given priority within the course content of any teaching qualification provided by teacher educators.

The questionnaire for teachers also asked respondents to state their perceived level of proficiency in a number of ICT skills areas.⁶³ The responses were arranged in descending order of proficiency, as shown in table 6.1, by combining "intermediate" and "advanced" from the principal variables of teacher's age group, gender, and SCR.⁶⁴

The highest levels of perceived proficiency were in use of the internet, e-mail, and word-processing, where more than half the teachers rated their proficiency as "intermediate" or "advanced." The lowest level was for programming and scripting, assistive technology, and careers software: fewer than 10% reported an intermediate or advanced level of proficiency in these areas. Again it is noteworthy that teachers under thirty-five considered themselves to be more proficient in practically all ICT skills areas, especially the internet, e-mail, word-processing, and presentation. The proficiency

61 "Informal qualifications" refers to such courses as the European Computer Driving Licence (ECDL).

62 Other academic qualifications in ICT might include a BSc in computer science or a BEng in computer engineering.

63 Respondents were able to state their level of proficiency in the different skill areas as "none," "basic," "intermediate," or "advanced."

64 See note 19 (chapter 2) for a definition of SCR.

of teachers of Irish in most skills areas was noticeably lower than that reported by teachers of other subjects.

Table 6.1: Proportion of post-primary teachers who rated their proficiency in ICT skills as either “intermediate” or “advanced”

	Age			Gender		SCR		Total
	Under 35	35–45	Over 45	Male	Female	Low	High	
Internet	84%	60%	55%	70%	66%	66%	68%	66%
E-mail	81%	58%	50%	66%	62%	61%	66%	63%
Word-processing	76%	57%	52%	61%	61%	58%	65%	61%
Presentation	59%	33%	30%	43%	41%	41%	43%	42%
Operating systems	51%	32%	29%	42%	37%	37%	39%	38%
Spreadsheets	46%	30%	29%	39%	33%	34%	37%	35%
File management	42%	26%	29%	38%	30%	30%	35%	33%
Reference software	39%	31%	29%	36%	32%	33%	33%	33%
Graphics programs	41%	24%	25%	36%	28%	30%	31%	31%
Databases	34%	22%	22%	27%	26%	26%	26%	27%
Multimedia	33%	19%	16%	30%	19%	23%	22%	23%
Troubleshooting	25%	16%	17%	26%	16%	20%	18%	20%
Content-rich software	18%	13%	21%	20%	16%	17%	20%	18%
Exploratory software ⁶⁵	20%	13%	16%	21%	14%	16%	19%	17%
Networking	14%	10%	9%	14%	10%	9%	12%	11%
Data-logging software	13%	8%	9%	13%	10%	9%	11%	11%
Drawing programs	13%	14%	6%	19%	6%	11%	9%	10%
Careers software	7%	6%	9%	6%	9%	7%	7%	8%
Assistive technology software	8%	7%	6%	9%	7%	4%	9%	7%
Programming or scripting	10%	5%	5%	8%	6%	7%	7%	7%
n	272	210	290	260	468	323	321	800

The survey also explored how often teachers used these ICT skills (by means of a range of applications) in their teaching. The internet (79%) and word-processing (79%), as fig. 6.1 shows, were the most popular applications used by teachers. Furthermore, the teachers who used these applications revealed a high level of proficiency in each application (i.e. at least 86% of teachers who use the applications had at least an intermediate level of knowledge of these applications).⁶⁶ On the other hand, teachers who reported using reference (for example encyclopaedias), content-rich and exploratory software in their teaching had a relatively low level of proficiency.

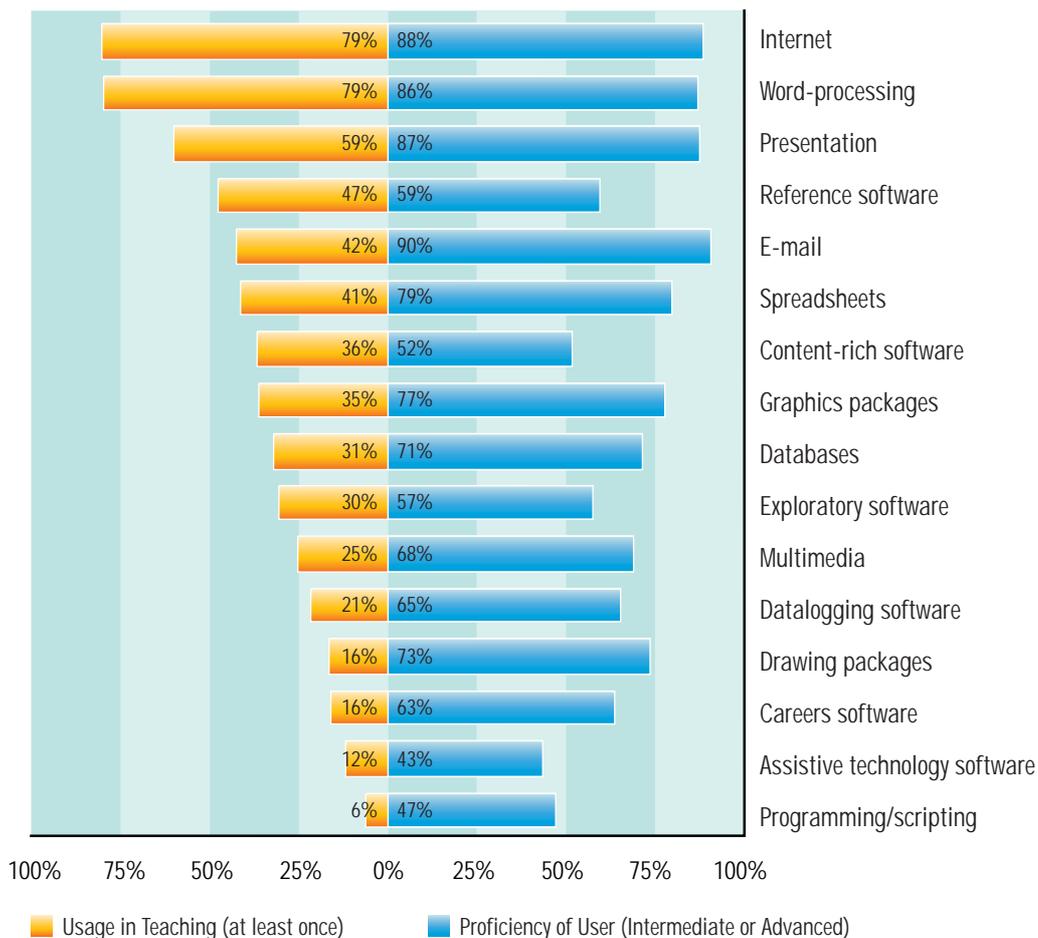
The findings also reveal that in many instances the level of reported proficiency was not reflected in the actual use of the application. The relatively low level of use in classroom practice of e-mail, spreadsheets, graphics programs and databases, for example, does not reflect teachers' high levels

⁶⁵ Exploratory software can be described as simulation-type software, usually subject-specific but with a high level of interactivity.

⁶⁶ Note: The “proficiency of user” scale in fig. 6.1 is based on the small number of teachers (15) who stated that they used these applications in their teaching.

of proficiency in these applications. It can be assumed, therefore, that other factors, such as teachers' motivation or computer access, may influence the transfer of teachers' competence in particular applications to classroom practice.

Fig. 6.1: Proficiency and use of applications in teaching



Base: Usage is based on teachers using applications in their teaching (n > 247)

Proficiency is based on teachers using applications in their teaching (n > 15)

Teachers were also asked in their survey to rate their ability at different tasks related to the application of ICT and related materials in the classroom. Table 6.2 shows that slightly more than a quarter (26%) of all teachers rated their ability as "intermediate" or "advanced" in relation to using teaching and learning methods that are facilitated by ICT. A similar proportion (27%) rated their ability as "intermediate" or "advanced" in relation to assessing the quality of educational software to facilitate teaching and learning, while four out of ten (40%) reported their ability to assess the quality of internet material to facilitate teaching and learning to be at that level.

Table 6.2: Proportions of post-primary teachers who rated their ability in each of three ICT tasks that facilitate teaching and learning as either “intermediate” or “advanced”

	Age			Gender		SCR		Total
	Under 35	35–45	Over 45	Male	Female	Low	High	
Using teaching and learning methods that are facilitated by ICT	38%	19%	22%	30%	25%	26%	27%	26%
Assessing the quality of educational software to facilitate teaching and learning	33%	20%	27%	30%	25%	27%	28%	27%
Assessing the quality of internet material to facilitate teaching and learning	54%	30%	33%	40%	40%	37%	43%	40%
n	272	210	290	260	468	323	321	800

The perceived ability level in all three tasks was higher for teachers aged thirty-five or under; but it is interesting to note that while the reported ability levels decreased somewhat for the 35–45 group they increased again for the over-45 category. This trend is also apparent from table 6.1 in perceived levels of proficiency in the areas of content-rich and exploratory software. This increase in skills level could be correlated with length of teaching experience. There was a negligible difference between the stated ability of teachers in schools with a low or high SCR. It is noteworthy that teachers of Irish, English and the subjects in the social studies II group (Religious Education, Physical Education, CSPE, and SPHE) provided a lower than average rating in each of the three ICT tasks.

As mentioned earlier, the survey found that 25% of teachers had a qualification in ICT. For the 75% who had no such qualification it can be deduced that their main means towards mastering the technology and its application was through their own enthusiasm for ICT and self-learning, or by availing of relevant professional development courses. The survey also found that, apart from the internet, e-mail, and word-processing, the majority of teachers—those with and without formal ICT qualifications—stated that they did not consider themselves to be proficient in an entire range of ICT skills and applications.

Finally, significant numbers of teachers rated their ability in each of the three ICT tasks that facilitate teaching and learning (see table 6.2) as basic or stated that had no ability in the area.

In general, the findings show that significant numbers of teachers lack intermediate-level ICT skills or better (table 6.1). This impedes them in integrating the technology in their teaching practice. Furthermore, of those who consider themselves to have these skill levels, many declare themselves

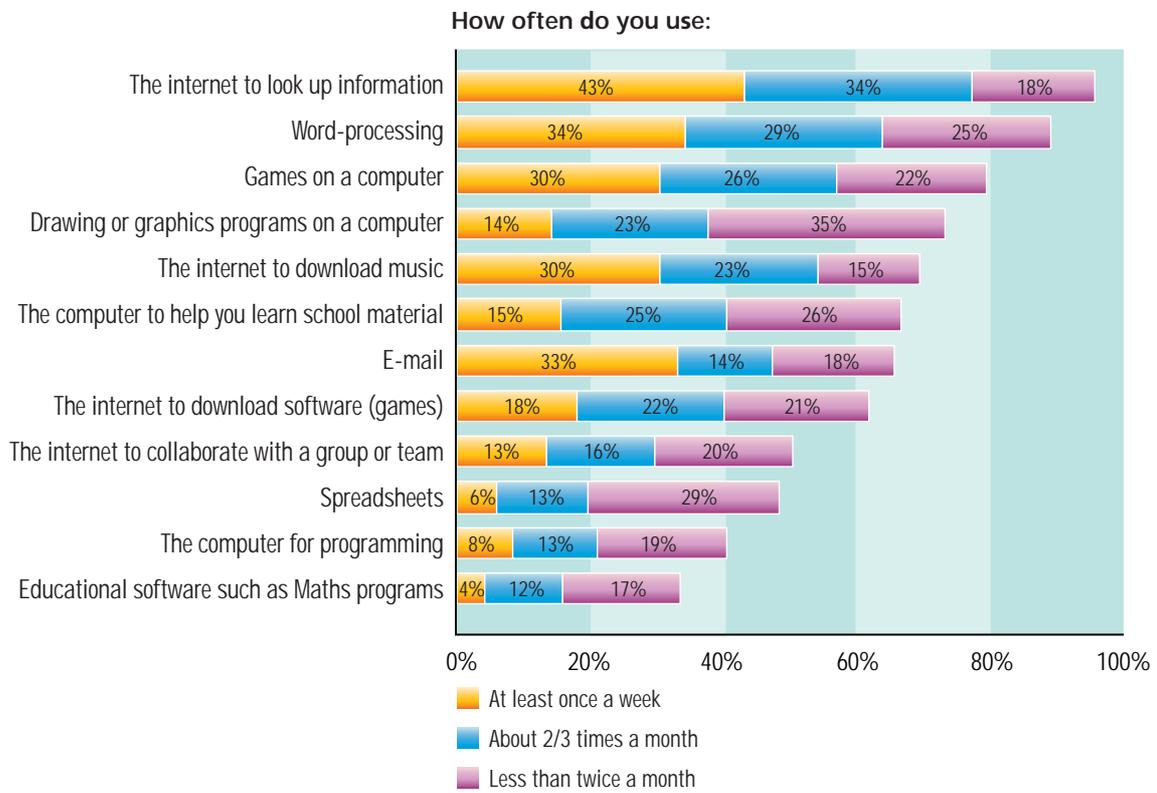


unaware of how to apply them so as to facilitate improved teaching and learning (table 6.2). Also, younger teachers perceive themselves to have higher levels of proficiency in a range of ICT skills than more established teachers. While this may reflect changes taking place in teacher education, it may also reflect the pervasiveness of technology in younger people's lives. If ICT is to be effectively integrated in the teaching and learning process it is apparent that these issues will need to be addressed in a strategic way, through, for example, a combination of pre-service, induction and in-service training.

6.2.2 Students' ICT skill levels

In general, the evaluation found that fifth-year students have a positive attitude towards the use of computers. There was a negligible difference between the attitudes of those in schools with a low SCR and those in schools with a high SCR. In their questionnaire, students were asked to state how frequently they used computers to perform certain tasks. Fig. 6.2 shows that more than three-quarters (77%) of respondents specified that they used the internet to look up information at least twice a month. More than half (53%) reported using the internet to download music at least twice a month.

Fig. 6.2: Students' use of computers



Base: All post-primary students (n = 450)

Responses also showed that students used a computer to perform the following activities at least twice a month: word-processing (63% of respondents), games (56%), and e-mail (47%). There was a negligible difference in how often those in schools with a low SCR performed these tasks compared with those in schools with a high SCR. This may be explained by the fact that schools with a high SCR were generally larger, where access to centralised computer rooms was more favourable.

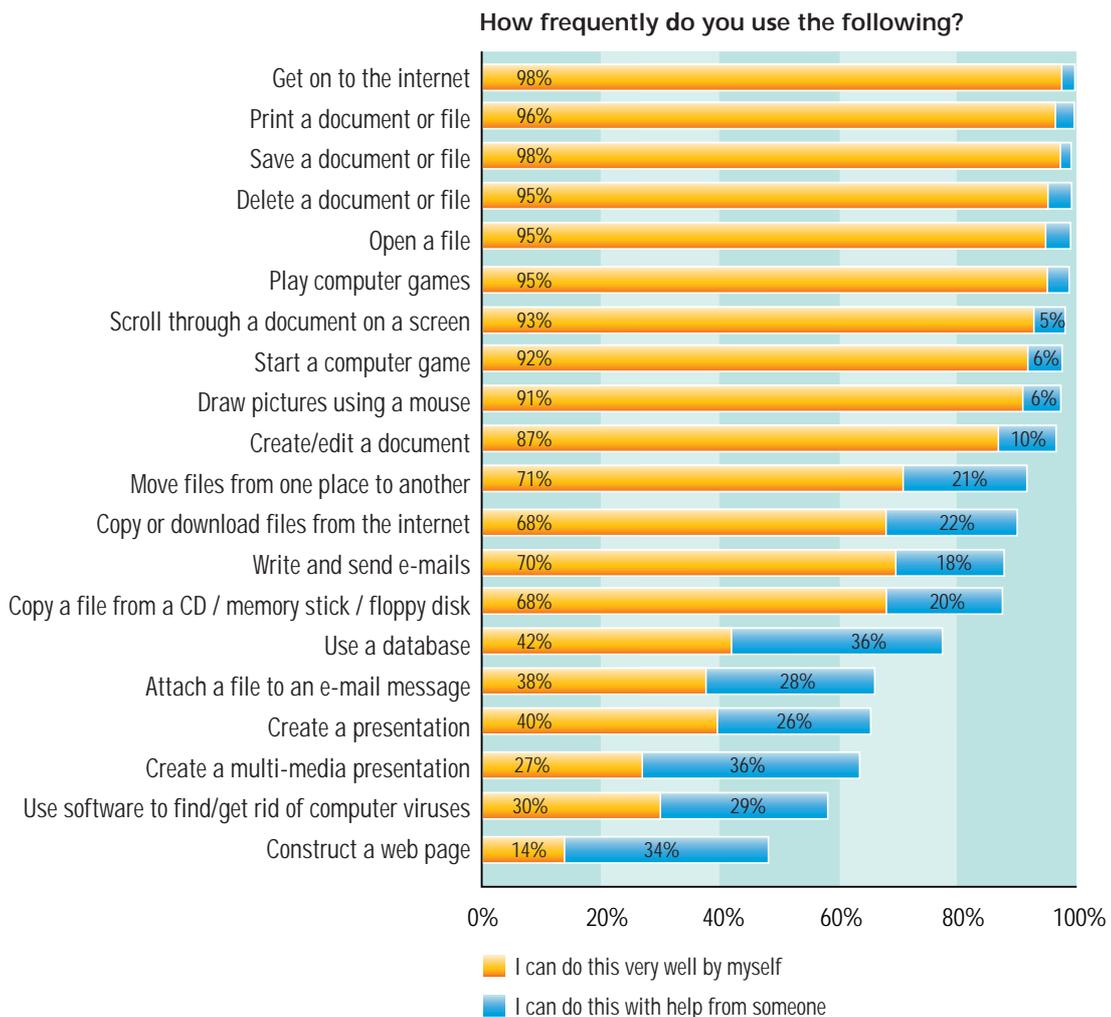
Students were also specifically asked to state what kinds of tasks they used computers for at school. The most frequent replies were research on the internet (71%), word-processing (62%), and general IT skills, for example file administration (32%). As will be seen in section 6.3.2, these are strikingly similar to the topics commonly taught in schools' dedicated ICT lessons. Nearly two-thirds (64%) reported using a computer to help them with their homework. However, only 19% of these did this at least once a week. This is perhaps an area that could be exploited further by schools and teachers, as some 89% of students reported having access to a computer at home.

Interestingly, 36% of students surveyed stated that they learnt most about computers by teaching themselves (45% stating that they taught themselves how to use the internet), while 33% stated

that they learnt most through their teachers. Those in schools with a low SCR were more likely to use a computer for recreational use (32%) or e-mail (22%) than those in schools with a high SCR (19% for recreation, 13% for e-mail). More students in schools with a high SCR stated that they were using computers to work with word-processing, presentation, and other applications.

Students also reported on how well they could perform certain tasks. As can be seen from fig. 6.3, they were confident that they could undertake many basic operations by themselves, for example saving, printing, deleting, opening and editing documents. It was found that, with some assistance, they could generally perform more complicated tasks, such as moving files, copying files to external storage devices, and writing and sending e-mail. A relatively low proportion, however, reported being able to create a multimedia presentation. It was found that they would require most help to attach a file to an e-mail message, construct a web page, or deal with computer viruses.

Fig. 6.3: Students' ICT skill levels



Base: All post-primary students (n = 450)

When developing ICT courses, schools should take account of students' previous ICT knowledge and skills, with a view to expanding and consolidating their repertoire of skills. This entails tracking the development of their ICT skills through their post-primary schooling and planning the content of dedicated ICT lessons accordingly. Little emphasis (as will be seen in section 6.3) is placed on more complicated ICT tasks during students' experience of ICT in their classrooms.

Interviews conducted by inspectors with fifth-year students in case-study schools revealed that they used computers mainly in the social studies I group of subjects (History, Geography, Art, Craft and Design, Music), in the LCVP link modules, and, unsurprisingly, in dedicated computer lessons. Inspectors also observed examples of work done by these students during evaluations. It was common for the work displayed to relate to the LCVP link modules or LCA tasks. One report described the work observed as follows:

Students presented examples of work they had produced using different software packages. These included word-processing to produce curricula vitae and questionnaires, Excel for problem solving in Mathematics and to produce timetables and lists of teams for sports, Publisher to produce notices and Paint to produce images which they then incorporated into the Publisher documents. The students interviewed were able to talk knowledgeably about the work they had done. They were also able to discuss [the] functionality of software that was not demonstrated in the work shown and could suggest likely locations within menus for functions with which they were not familiar.

Another report mentioned that

examples of word-processing, as well as digital camera work undertaken as part of their work for Art, Craft and Design lessons, were made available for examination. The work observed was of a high quality and students were able to hold a discussion about it in a capable and confident manner.

There was a strong correlation between the samples of students' work observed by inspectors and those activities students performed most often (as shown in fig. 6.2), as well as the tasks for which they reported themselves as being most proficient (as shown in fig. 6.3).

In general, the quality of the students' ICT work observed in schools was described in very positive terms by inspectors. In all the reports in which students' work was commented on it was mentioned that they were capable of discussing it in a competent and confident manner. Nevertheless, it was also clear that the range of work observed was somewhat limited. It is recommended, therefore, that teachers broaden the range or type of ICT work that they cover with students.

6.3 Dedicated ICT lessons

This section begins by examining how dedicated ICT lessons are timetabled, with particular reference to levels of provision in both the junior and the senior cycle. It also refers to the curriculum that schools implement during these lessons.

6.3.1 Timetabling of dedicated ICT lessons

In their national survey, school principals were asked to provide details about all timetabled dedicated ICT lessons in their schools. Table 6.3 provides details of the provision of these lessons in 110 post-primary schools.

Table 6.3: Timetabled dedicated ICT lessons in post-primary schools

	First year	Second year	Third year	Transition Year	Leaving Certificate year 1	Leaving Certificate year 2
Proportion of schools that timetabled ICT lessons	70%	45%	35%	62%	69%	66%
Average number of lesson periods per week	1	1	1	4	2	2
Base: All post-primary schools with timetabled ICT lessons (n = 110).						

The proportion of schools that timetabled ICT lessons fell from 70% to 35% from first year to third year (that is, as the Junior Certificate examination drew closer for students, their exposure to dedicated ICT lessons ceased in many schools). The average number of lesson periods per week throughout the three years of the junior cycle was one. However, the proportion of schools that timetabled ICT lessons increased to more than 60% of all schools for senior cycle students (Transition Year and Leaving Certificate). For Leaving Certificate students in particular, the high proportions were attributed primarily to the LCVP and LCA programmes. The average number of lesson periods was greater in the senior cycle than in the junior cycle, especially for Transition Year students.

A similar pattern in the provision of dedicated ICT lessons was found in the case-study schools. In the majority of inspectors' reports, junior cycle students were reported as not being timetabled with any dedicated ICT lessons. In such instances the school management usually commented that these lessons had been dropped as a result of timetabling pressures to provide access to new junior cycle subjects. In other schools, ICT lessons had been reduced to one lesson period per week in first or second year, with no provision in third year. It was clear from reports that the majority of case-study schools concentrated on providing their students with dedicated ICT lessons in their Transition Year, LCVP, or LCA.

The Transition Year programme was provided in 14 of the 20 case-study schools visited. Dedicated ICT lessons formed part of the programme in most of these schools. Problems arose, however, in schools where the Transition Year was an optional programme and students had chosen to transfer directly to the established Leaving Certificate programme. In a number of these schools, students

expressed concern about the fact that they were not provided with any dedicated ICT lessons. In contrast, those who had opted for the Transition Year, or for either the LCVP or LCA, had significantly greater access to dedicated ICT lessons. ICT lessons in the Transition Year usually took the form of a discrete ICT module, the content of which varied from the completion of the European Computer Driving Licence (ECDL) programme to desktop publishing or web design. While teachers generally viewed the ECDL as a comprehensive and well-recognised qualification, they also reported that it had some pitfalls. It necessitated, for example, significant numbers of timetabled lessons per week, it required refresher courses to be completed at future intervals, and it was costly.

Transition Year students in all the case-study schools were frequently exposed to ICT in ways other than dedicated ICT lessons. Many Transition Year activities, for example, involved students using ICT (for example the production of publicity material about a school show or the production of a school memorial calendar).

The LCVP was provided in 16 of the 20 case-study schools. Students are required to study two link modules as part of this programme.⁶⁷ In essence, it was this requirement that encouraged these schools to furnish their students with lessons in a computer room, with many even facilitating them with access to computers outside timetabled lesson time. Students are part-assessed in these link modules by means of a portfolio of work, and the items for inclusion in this portfolio require the use of ICT for both their research and their presentation.⁶⁸ It was interesting to note that during interviews with fifth-year students in case-study schools it was predominantly those following the LCVP who stood out as being able to speak most about their use of ICT in school. These students were also more likely to show inspectors samples of their work. (This issue is examined further in section 6.4.2.)

The LCA requires all candidates to study a mandatory introductory module on ICT. It also requires the provision of access to ICT within the subjects provided on the programme, and there is also a significant cross-curricular aspect to ICT. Furthermore, LCA students have an option to study a vocational specialism in ICT as part of the programme; if they opt for this they are required to study four modules out of a possible six.⁶⁹ LCA students are assessed through the presentation of tasks, and these are normally presented using ICT. For these reasons the programme was found to stimulate a significant integration of ICT in classroom activities in the 11 of the 20 case-study schools that were found to offer the programme. It was clear that these schools had embraced the use of ICT as an integral aspect of teaching and learning within the programme. LCA students interviewed were competent and confident in discussing their use of ICT within subjects and in the completion of tasks and assignments. The quality of tasks and assignments was described in one evaluation report as showing "good range and breadth," while in another they were described as being of a "high quality" and "impressive."

67 Link modules: (1) Preparation for the World of Work and (2) Enterprise Education.

68 There are four compulsory core items: a CV, a career investigation, a summary report, and an enterprise or action plan. Pupils must also submit any two of the four optional items: a diary of work experience, an enterprise report, a recorded interview or presentation, or a report on "My own place."

69 The six modules are word-processing, databases, spreadsheets, desktop publishing (page layout), internet, and text entry.

The LCVP and LCA have both embraced the use of ICT in their curriculum, and this no doubt goes some way towards explaining the frequency with which they were noted in evaluation reports. The Transition Year programme makes possible a flexibility in approach and the use of alternative and additional teaching methods, and this may account for its strong association with the use of ICT by teachers and students. It was noted by some teachers that their experience of teaching Transition Year, LCA or LCVP had encouraged them to integrate ICT in their work with other classes not associated with these programmes.

6.3.2 Curriculum and content of dedicated ICT lessons

Approximately 17% of the 800 teachers surveyed stated that they taught ICT as a discrete subject in one or more of the junior cycle, Transition Year or Leaving Certificate programmes. These teachers were asked to state the kind of material they covered in these lessons. The topics found to be most frequently taught at each level are shown in table 6.4.⁷⁰

Table 6.4: Commonly taught topics in dedicated ICT lessons

	Junior cycle	Transition Year	Established LC	LCA	LCVP
Most frequent	Word-processing (83% of ICT teachers)	Word-processing (76% of ICT teachers)	Word-processing (74% of ICT teachers)	Word-processing (87% of ICT teachers)	Word-processing (93% of ICT teachers)
Second most frequent	Internet (65% of ICT teachers)	Internet (76% of ICT teachers)	Spreadsheet (64% of ICT teachers)	Spreadsheet (83% of ICT teachers)	Internet (46% of ICT teachers)
Third most frequent	Spreadsheets (61% of ICT teachers)	Presentation (72% of ICT teachers)	Internet (62% of ICT teachers)	Internet (73% of ICT teachers)	Presentation (37% of ICT teachers)
n	77	58	42	30	41

An analysis of the survey also found that Computer Studies as a subject in the junior cycle (an optional and non-examination subject) was provided in only 13% of the 110 post-primary schools that responded.⁷¹ At Leaving Certificate level Computer Studies (again an optional and non-examination subject) was provided in 23% of those schools.⁷² The syllabuses for these subjects are given in the *Rules and Programme for Secondary Schools*. At Leaving Certificate level, students who take Computer Studies and who perform satisfactorily are issued with a statement to that effect by the DES. The Department issued such statements to 5,419 students from 102 post-primary schools for the 2005/06 school year. With 50,995 sitting the established Leaving Certificate and LCVP in 735 schools in 2006, it can be seen that a relatively small proportion (approximately 11%) received Computer Studies statements.

⁷⁰ Care must be taken when interpreting the results from this table, as sample sizes are low.

⁷¹ Junior cycle computer studies was provided in 6 of the 31 vocational schools whose principals responded to the survey, in 8 of the 63 secondary schools, and in none of the 16 community and comprehensive schools.

⁷² Computer studies at the Leaving Certificate level was provided in 6 of the 31 vocational schools whose principals responded to the survey, in 16 of the 63 secondary schools, and in 2 of the 16 community and comprehensive schools.

Further analysis of the survey of principals showed that this statement was not the only form of certification offered by schools. It was found, for example, that approximately 70% of schools surveyed provided ECDL courses, while 28% provided FETAC courses. Other forms of certification that were mentioned included Commercial Examination Board (CEB) certification and City and Guilds of London certification.

The syllabuses for Computer Studies at the Leaving Certificate level and in the junior cycle, as contained in the *Rules and Programme for Secondary Schools*, are virtually unchanged since their introduction in 1980 and 1985, respectively.⁷³ At this point, much of their content may be considered outdated. In the absence of a review, many schools, as alluded to above, have made other arrangements to provide students with a comprehensive and modern programme of study in ICT. The emphasis in these newer programmes is on covering popular computer applications, as distinct from the more detailed study of computing found in the Computer Studies syllabuses. Given the outdated nature of the syllabuses, the relatively low numbers of schools availing of the subject, and the dynamism of schools in devising and organising their own ICT curricular programmes, consideration now needs to be given to either removing these syllabuses from the *Rules and Programme for Secondary Schools* or reviewing them. This would be complemented by the application in schools of the “Framework for ICT in Curriculum and Assessment” at present being developed by the NCCA. (See chapter 1 for further details of this framework). Notwithstanding both these developments, schools would still need to be advised about what constitutes an appropriate education in ICT in the senior cycle. The NCCA, in collaboration with the NCTE, is best placed to advise schools on this issue.

In general, the evaluation found a low level of provision of dedicated ICT lessons in the junior cycle. However, there is significant integration of ICT in the senior cycle Transition Year, LCVP, and LCA, including the provision of dedicated ICT lessons. It was also found that schools generally approach the organisation of these lessons differently. They can, for example, use one of a range of ICT programmes or syllabuses, as well as different forms of certification. While bearing in mind curricular and timetabling pressures, schools should endeavour to balance the ICT experience they plan to provide within a particular programme throughout the life span of that programme (for example the junior cycle or senior cycle). The NCCA “Framework for ICT in Curriculum and Assessment” will assist schools in this regard. In situations where this cannot be done by means of dedicated ICT lessons, other ways of providing access to ICT could be explored, for example the setting up of a school computer club.

6.4 Classroom practice and ICT

Inspectors completed ICT review schedules during 168 subject inspections carried out in 111 schools. These review schedules comprised a short questionnaire on ICT issues. Some questions

⁷³ At the Leaving Certificate level schools devise their own syllabus, but the broad outlines of the subject are specified by the DES.

were directed to the principal, while others were asked of the teacher (or teachers) of the subject (or subjects) being inspected. The questionnaire was completed in separate interviews with both principals and teachers. The review schedule also required the inspectors to comment on the integration of ICT in teaching and learning in the lessons observed. A total of 311 lessons were observed.

6.4.1 School principals' support for the use of ICT in the classroom

Principals in each of the 111 schools visited reported to inspectors that some level of ICT resources was available to the subject (or subjects) being evaluated in their school. (The case-study school evaluations yielded a similar finding: the principals of all twenty schools visited claimed that each subject on their school's curriculum had access to ICT facilities.) Inspectors were provided with various descriptions of these resources; these included the level of hardware available to a subject (such as the number of computers and peripherals) as well as the range of computer applications and the type of internet connection installed, if any. In some schools the ICT resources available for a subject were in the classroom while in others the subject inspected was described as being able to avail of the school's general ICT facilities, such as the computer room.

Principals were asked to distinguish between the resources available to a subject (or subjects) and those which were used in the teaching and learning of that subject (or subjects). Altogether, 60% of principals in the 111 schools visited reported that available resources were being used in the teaching and learning of subjects. These principals provided examples of how ICT resources were being employed; some of these are summarised in table 6.5.

Table 6.5: Principals' descriptions of how ICT is used in some subjects

	Example from school principal of how ICT resources are used in teaching and learning in this subject
English	Students use the internet for research.
Science	Used in the general preparation of materials and tests. One teacher is particularly skilled at ICT and has developed multimedia presentations that include animations and video clips.
Music	Twenty computers in the library have music software installed and are used to teach the technology component of the Leaving Certificate course.
Construction Studies	Each class goes to the computer room about once a week. All students of the subject do some computer-aided design (CAD) work and produce a working drawing for their examination design brief. The computer room is also used for researching project work.
History	Two history teachers use the classroom with the interactive whiteboard to teach their students weekly. All four history teachers prepare lesson materials and examination papers using word-processing and web sites. The teachers maintain computerised records of students' progress.

An analysis of principals' views found that ICT resources were being used more frequently and effectively to assist teaching and learning in the science and social studies I subjects (History, Geography, Art, Craft and Design, and Music). The lowest use of resources, according to the principals, was in foreign languages. Interviews with principals during case-study school evaluations confirmed this finding: subjects reported as being prominent in making effective use of ICT included Science and applied science subjects, Guidance, and History.

The national survey of principals asked them to comment on how the use of ICT in their school was benefiting teaching and learning. A sample of the comments offered by principals in different school types and sizes is provided in table 6.6. It was found that 51% of the 110 principals surveyed were of the view that ICT contributed to improving lesson content, 39% felt that its use in lessons contributed to improved ICT skills, while 20% described how ICT contributed to improving teaching skills.

Of the 40% of principals who reported during subject inspections that there was no use of ICT in subjects, even though ICT facilities were reported as being available, many cited a number of reasons for this. It was reported, for example, that there were inadequate facilities or access problems, or both, in some schools, as well as scheduling difficulties, inadequate teacher education and support, and a lack of confidence or interest on the part of the teacher.

Table 6.6: Principals' views on the impact of ICT on teaching and learning

School sector, type, size	Principals' views on how ICT benefits teaching and learning
Vocational, co-educational, large (600+)	Improved access to information, teaching aids and learning aids through use of internet and learning software. Students have become more "computer-literate." They have become more familiar with diversity of uses attributable to the computer. ICT is an important aid in self-directed learning. ICT is very useful for project work and in the implementation of alternative programmes, such as JCSP and LCA.
Secondary, single-sex, medium (400–599)	Preparation of class materials. Increasing use of data projectors. Quality of prepared hand-outs and examination papers. Use of internet for research in various subjects.
Secondary, single-sex, large (600+)	ICT allows for varied teaching methods; students attuned to screen presentation; multi-sensory approach; use of internet and reference resources for project work. The ability to produce and distribute hand-outs facilitates students' focus on content. ICT cuts out repetitive and time-consuming blackboard work. It facilitates exchange and sharing with other teachers and students.
Secondary, single-sex, large (600+)	Teachers feel challenged and empowered. Students find the use of ICT in lessons to be special and exciting.
Vocational, co-educational, medium (400–599)	ICT facilitates research. It improves presentations of work and acquaints students with technology of the work-place.
Secondary, co-educational, small (fewer than 400)	ICT makes learning more interesting and interactive for students. It motivates both students and teachers and increases knowledge of the latest technology and methods of learning.

6.4.2 ICT in practice in the classroom

ICT facilities in classrooms

It was clear from inspector's observations that the extent of use of computers is subject-related or classroom-related. Details of the location of 307 of the 311 lessons observed are given in table 6.7.

Table 6.7: Location of lessons observed during subject inspections

	General classroom	Computer room	Specialist room	Other	n
Science	15%	0	85%	0	54
Applied Science	10%	4%	87%	0	52
Social Studies I	49%	4%	45%	2%	51
Foreign languages	89%	7%	5%	0	44
English	86%	3%	11%	0	36
Mathematics	81%	10%	10%	0	21
Business Studies	88%	6%	6%	0	16
Irish	100%	0	0	0	14
Social Studies II	0	0	0	100%	8
Other	45%	45%	9%	0	11
n = 307					

Specialist rooms were used more extensively for science or applied science subjects and, to a lesser extent, subjects in the social studies I group (History, Geography, Art, Craft and Design, and Music). Foreign-language, English, Business Studies and Mathematics lessons were predominantly conducted in a general classroom. All the Irish lessons observed were conducted in a general classroom.

Table 6.8: ICT resources available in the classrooms of lessons observed

	No ICT resources	Computer (or computers)	Data projector	Other	n
Science	42%	58%	27%	11%	55
Applied Science	54%	44%	17%	21%	52
Social Studies I	76%	18%	8%	13%	38
Foreign languages	86%	11%	8%	6%	36
English	85%	15%	0	3%	34
Mathematics	75%	25%	5%	15%	20
Business Studies	59%	41%	18%	12%	17
Irish	100%	0	0	0	13
Social Studies II	86%	14%	0	0	7
Other	20%	80%	60%	20%	10
n = 282					

Table 6.8 gives details of ICT resources available in the classrooms where lessons were observed. As can be seen, excluding the “other” category - which includes Computer Studies - computers and data projectors were more likely to be observed during a science lesson (58% of the science lessons observed had computers available in the room, while 27% had a data projector). Nevertheless, where a computer was present in a Science lesson, the majority of rooms (72%) had only one computer. The majority of classrooms in which foreign-language, English and Mathematics lessons were conducted, which were predominantly general classrooms, had no ICT facilities present. None of the Irish lessons observed had ready access to ICT facilities.

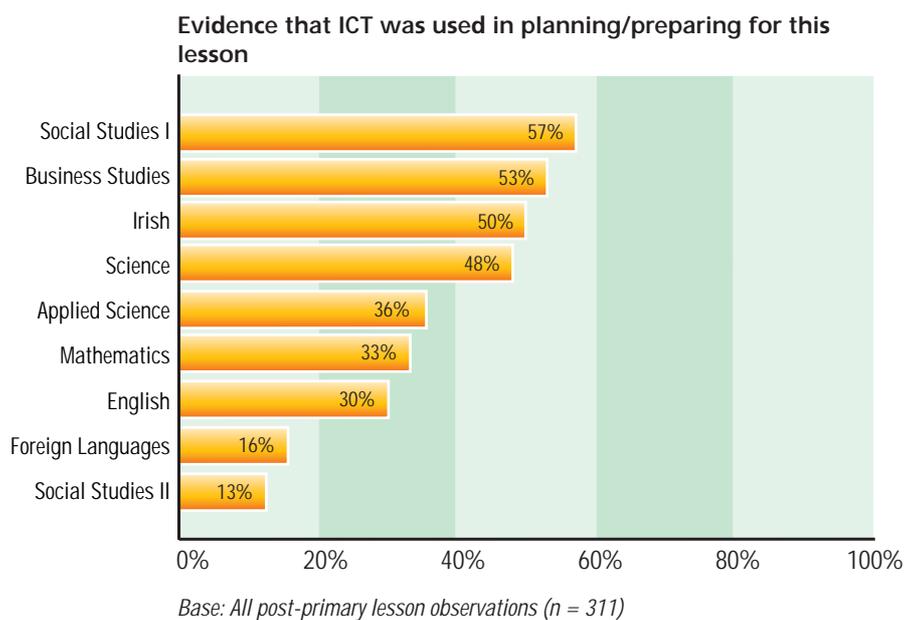
The findings of the national survey of teachers also showed that computers were most frequently used in classrooms by teachers of the science subjects (70%), applied science subjects (64%), and Mathematics (61%). A lower than average proportion of teachers of Irish (41%) reported using computers in teaching.

The case-study school evaluations also found little evidence of students’ engagement with ICT in general classroom settings. It is clear that there is a greater permeation of computers in specialist rooms than in general classrooms. However, as already recommended in chapter 3, efforts need to be aimed at equipping general classrooms also.

ICT use in the planning and preparation of observed lessons

Inspectors reported evidence of ICT being used in the planning or preparation of 128 (41%) of the 311 lessons observed. The level of use by subject area is illustrated in fig. 6.4.⁷⁴

Fig. 6.4: Use of ICT in the planning and preparation of observed lessons



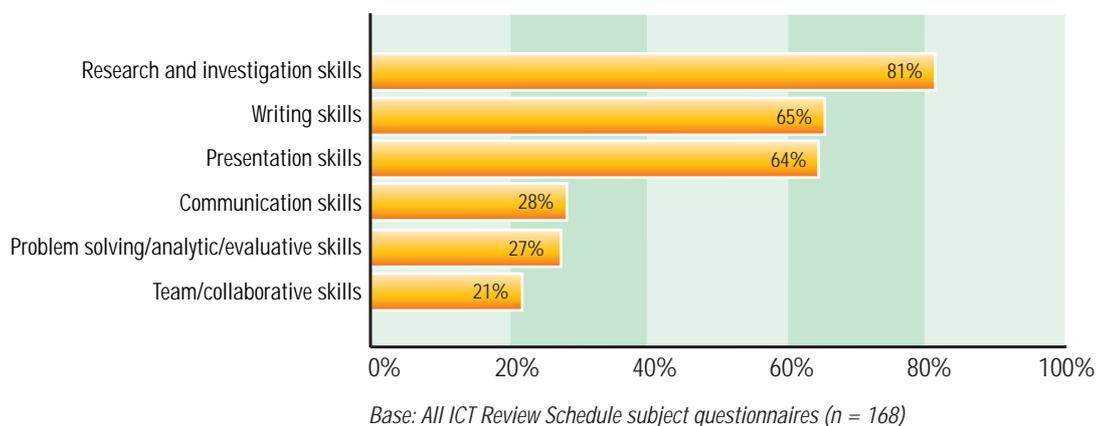
⁷⁴ All social studies II lessons were Physical Education.

ICT was used in the planning and preparation undertaken by teachers in 57% of the social studies I subject lessons observed (History, Geography, Art, Craft and Design, and Music). A higher than average rate of ICT use in planning and preparation was noted in the Business Studies and Irish lessons observed. This finding for planning for Irish lessons contrasts sharply with the low level of use of ICT in Irish lessons reported earlier. The lowest rate of use of ICT in planning and preparation was for social studies II subjects (Religious Education, Physical Education, CSPE, and SPHE) and foreign-language lessons.

Focus of ICT use

During the subject inspections in schools inspectors interviewed all the teachers of the subject being inspected. Specifically, they asked them what use they made, if any, of ICT during teaching and learning in their subject (or subjects). The findings are illustrated in fig. 6.5.

Fig. 6.5: Main uses of ICT in teaching and learning in the subjects inspected, as reported by teachers



The interviews revealed that the main use for ICT in all subjects inspected was to help students develop their research and investigation skills (81% of teachers interviewed). Teachers also reported using ICT frequently to develop students' writing and presentation skills (65% and 64%, respectively). ICT was less likely to be used to develop higher-order skills, such as problem-solving, analytical and evaluative skills (27%). It was found that ICT was least likely to be used to develop students' teamwork and collaborative skills (21%).

In an era when the essential skills of the work force include an ability to handle and process large amounts of information and an ability to work collaboratively as part of a team, it is important that the school curriculum would provide teachers with opportunities to integrate the development of these ICT skills in their teaching.

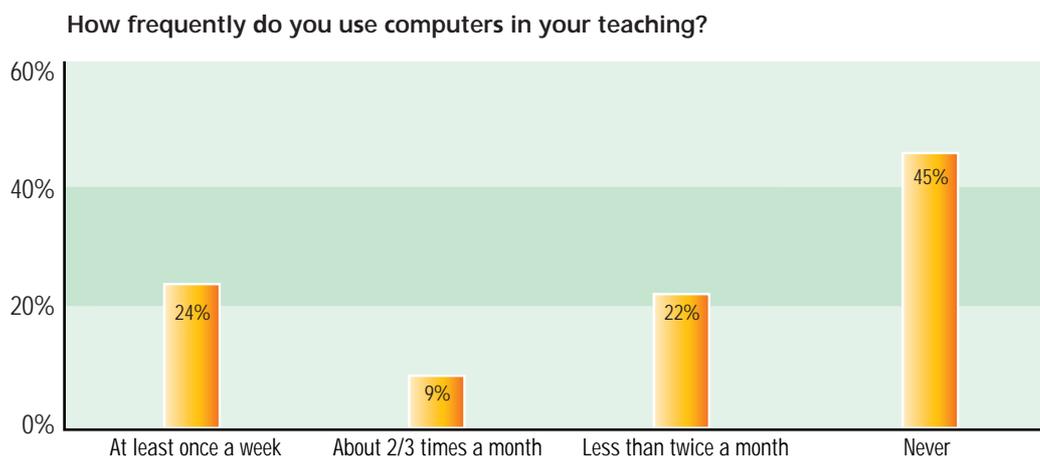
Frequency of ICT use

Evidence from the subject inspections suggests that the incidence of ICT use in teaching and learning is low. Furthermore, of the teachers who integrate ICT in their classroom practice many have come to rely on only a small repertoire of teaching methods that use the technology.

Only 56 (18%) of the 311 lessons observed during subject inspections incorporated the use of ICT. Students' interaction with the technology was observed in only about a quarter (24%) of these. Two activities in particular dominated these fifty-six lessons. The first was where the teacher used a computer and data projector to give a presentation to a class group. The majority of these presentations were text-based and did not fully use the potential of the medium.⁷⁵ The second was where the teacher used a computer to search the internet during a lesson. In most of these instances the teachers had a printer that made it possible to print material that could be used as a teaching aid. However, in most instances a digital projector would have saved valuable teaching time and might have contributed more to engaging students in the lesson.

The survey of teachers suggested a higher degree of computer use in teaching and learning than that observed by inspectors—55% of teachers reported using computers in their teaching at some time (see fig. 6.6). However, teachers' use of ICT in teaching and learning on either measure was significantly less than their use of ICT in planning and preparing lessons (78% of teachers).

Fig. 6.6: Frequency of use of computers in teaching



Base: All post-primary teachers (800)

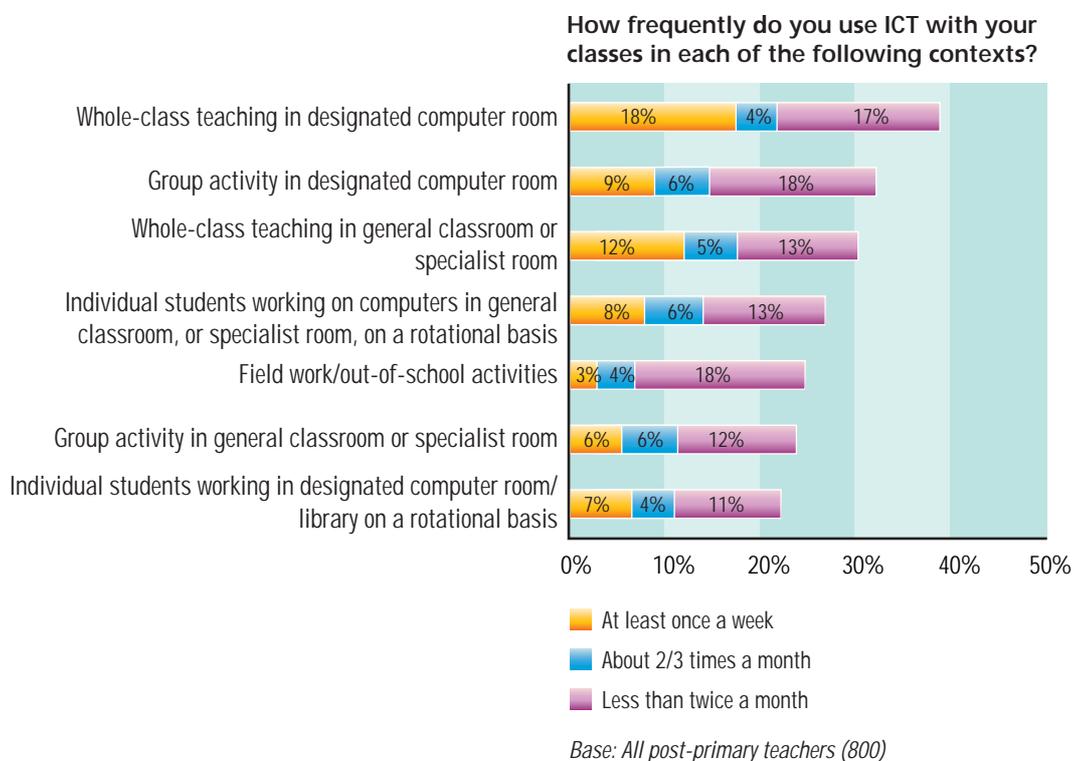
Organisation of ICT use

It is clear that the most common teaching mode in which ICT was used in those lessons observed by inspectors was where the teacher took charge of the technology. When interaction with students did occur it usually involved the individual use of the computer, in rotation, in general classroom

⁷⁵ For example, there was little use of such resources as video clips, animations, sound or internet simulations in any of the presentations observed.

settings; but some examples of small-group work on the computer were also observed in specialist room settings. It was possible for group work to take place in these rooms because they usually had more than one computer. However, the use of computer rooms, where individual students had access to a computer, was rare in most subject inspections. Of the 311 lessons observed, only 11 were held in computer rooms. Fig. 6.7 gives details of how frequently teachers reported using ICT with their students in a range of settings.

Fig. 6.7: Settings in which ICT is used in classrooms



The survey found that the most popular teaching mode in which ICT was used was whole-class teaching in a dedicated computer room (implemented by 39% of all teachers). In such instances all students would generally have individual access to a computer. The survey revealed that this mode was employed most frequently by teachers of Business Studies, Mathematics, and English. The next most frequent teaching mode (32%) involved group activity in a dedicated computer room; this was followed by whole-class teaching in a general or specialist classroom (30%).⁷⁶ It is noteworthy that the SCR in a school had a negligible effect on the use of ICT in any of these settings. It can be concluded, therefore, that teachers' willingness to use ICT is at least as important as the availability of ICT equipment.

⁷⁶ The survey found that approximately 17% of the 800 teachers who responded taught ICT as a discrete subject. This may have had an influence on the numbers of teachers who reported teaching in a dedicated computer room.

Teaching activities incorporating ICT

As mentioned earlier, the range of activities employed by teachers during subject inspections that incorporated ICT was limited. (The two most popular activities observed were where the teacher used ICT equipment to give a presentation or to look up information on the internet.) While a limited number of other activities were employed during observed lessons, a greater range was either evidenced or reported by teachers during the evaluations undertaken in the case-study schools. These activities included the following (presented in no particular order):

- word-processing (by teachers and students)
- internet searches by students, for example finding foreign-language newspapers as part of a language lesson, or visualising earthquakes on line as part of a geography lesson. The internet was seen as a particularly useful resource in some schools for “newcomer” students, who used it for translation and communication purposes
- the use of subject-specific software by students individually, in pairs, or in small groups, for example CAD in the applied science subjects and Qualifax in Guidance
- creating video stories from text
- using digital cameras
- using graphic calculators, especially in Mathematics
- data-logging and using digital microscopes in science lessons
- using DVD resources, for example for case studies
- recording students’ work, including photographic material, on DVD
- using specific ICT equipment related to particular subjects, for example computer numerically controlled (CNC) lathe and router in Engineering and Construction Studies.

The survey of teachers explored two of these ICT-related activities in greater detail, namely use of the internet and use of applications.

Use of the internet

The survey of teachers asked them about the use they made of the internet to facilitate teaching and learning. Only 34% of respondents, as shown in table 6.9, stated that they used the internet in their classroom practice. Approximately 66% of teachers, therefore, do not use the internet in their classroom practice. The reasons for not using it included the fact that there were no computer facilities or internet access in classrooms (see table 6.8), and that the teachers lacked the necessary knowledge of how to use it, or the time to devote to it.

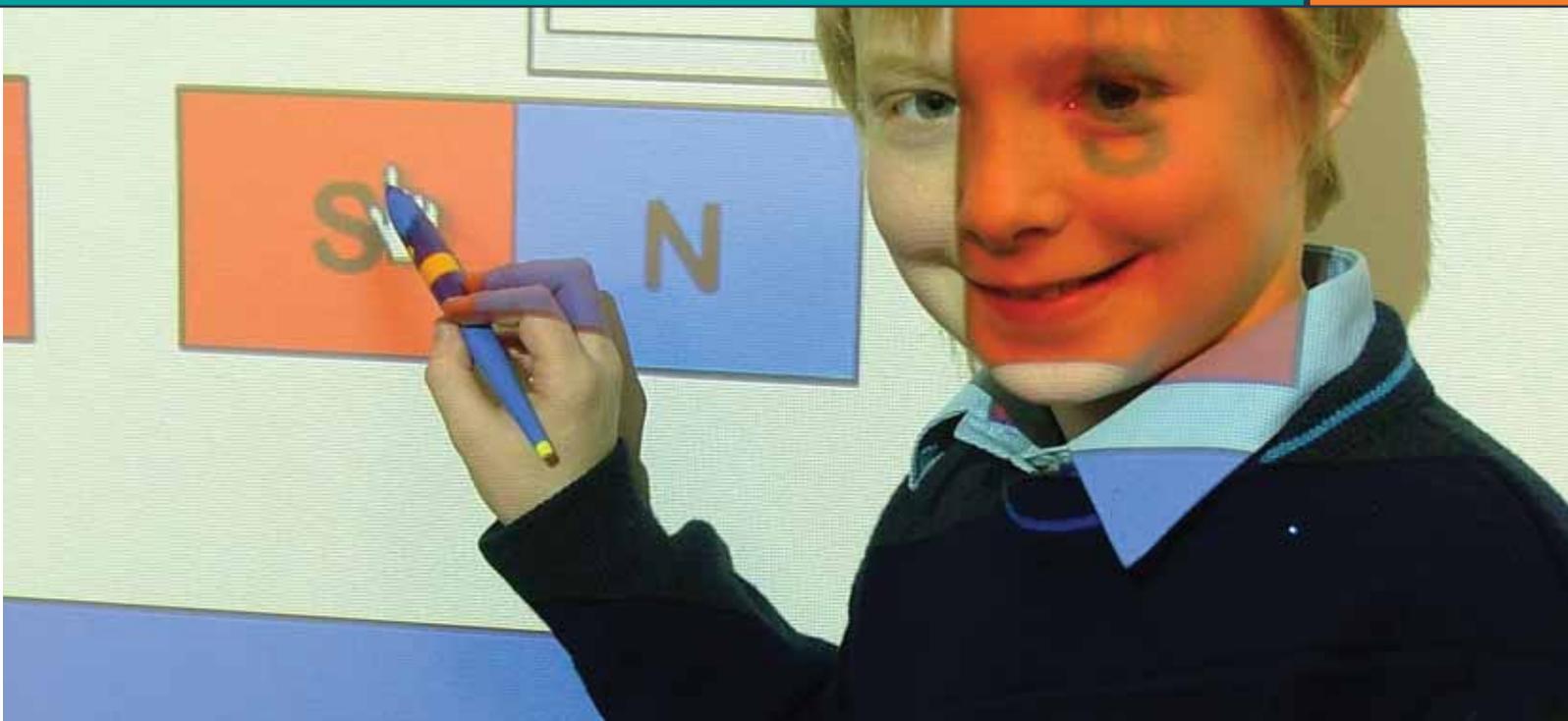


Table 6.9: Use of the internet and software in teaching and learning

Proportion of respondents answering “yes” to—	Age			Gender		SCR		Total
	Under 35	35–45	Over 45	Male	Female	Low	High	
using the internet in their classroom practice	41%	30%	29%	37%	33%	38%	31%	34%
using software to facilitate teaching and learning	56%	46%	48%	51%	50%	50%	51%	50%
n	272	210	290	260	468	323	321	800

With regard to both use of computers and use of the internet, it seems that teachers are more amenable to using these resources in lesson planning and preparation than in the classroom environment. There is little doubt that this is directly related to the current limited availability of ICT resources in classrooms.

Use of software

Computer applications were used to facilitate teaching and learning, as shown in table 6.9, by 50% of the teachers who responded to the survey. The most popular type of application used was word-processing (71%); this was followed by presentation software (59%), reference software (47%), and content-rich software (36%). These teachers reported that the most common method they used for selecting applications was by asking other teachers for their advice or by consulting educational web sites.

It is worth noting that teachers’ age had a bearing on the proportion using both internet and software resources in lessons: teachers under thirty-five (as can be seen from table 6.9) were more likely to use these resources.

ICT use in subjects

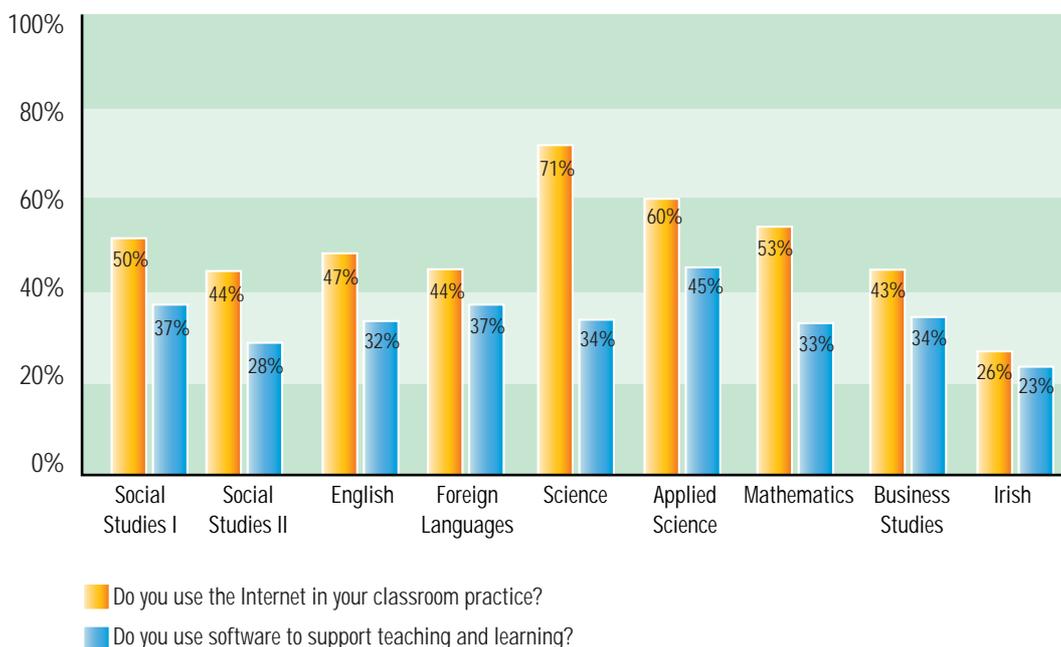
The ICT review schedules, the survey of teachers and the case-study school evaluations all reported that ICT was used in different subject areas to varying degrees. It is clear, however, that a number of subject areas excel in this respect. Significant integration of ICT was found to occur in the teaching of Science and applied science subjects, as well as in the social studies I group of subjects (History, Geography, Art, Craft and Design, and Music). The use of data-logging was popular in the science subjects, along with computer-aided design (CAD) software in the technology subjects. One case-study school report in particular mentioned that the students

demonstrated their use of the parametric CAD software to develop and rotate drawings. These students were quite enthusiastic about the support the use of this program brought to their learning in the subject, mentioning that the ability to view a three-dimensional drawing and to rotate it through different angles made it much easier to visualise the actual artefact. Like other applications of ICT being used in the school, this is a good example of how ICT can be used to enhance the students' learning experience.

A number of subjects were also identified as regular users of ICT, including Guidance and foreign languages. The use of ICT for pen-pal projects and e-twinning to support the study of modern languages was regularly mentioned by inspectors in their case-study school evaluation reports. The use of specialised programs for careers research in whole-class settings, particularly in the LCA and LCVP, was also emphasised in numerous case-study evaluation reports. In other instances ICT was used individually to assist with career guidance for students.

Finally, subjects were identified in which there was minimal use of ICT, most notably in Irish. This was not helped by the fact that all the Irish lessons observed during subject inspections took place in general classrooms that had no ICT facilities present.

Fig. 6.8: Use of the internet and applications, by subject area



Base: All post-primary teachers (800)

Fig 6.8 shows that a high proportion of teachers of science subjects (71%) and applied science subjects (60%), as well as Mathematics (53%), reported using software to facilitate teaching and learning. The internet was used mostly by teachers of applied science subjects (45%). A relatively low proportion of teachers of Irish reported using the internet (23%) and applications (26%).

It was noteworthy from case-study school reports that the provision of recent continuing professional development by support service teams had an effect on the level of integration of ICT in teaching and learning for the subjects concerned. Teachers interviewed during the case-study school evaluations mentioned that the support services had introduced them to the idea of engaging with ICT as part of their approach to teaching. This support was provided, in all instances, in the context of syllabus revision. This in turn would point to the fact that the NCCA policy of “ICT-proofing” syllabuses and guidelines of subjects as they are being reviewed or revised is paying dividends. This ICT-proofing process has the effect of establishing the role of ICT as a teaching and learning tool, and as an integral part of the curriculum and assessment procedures.

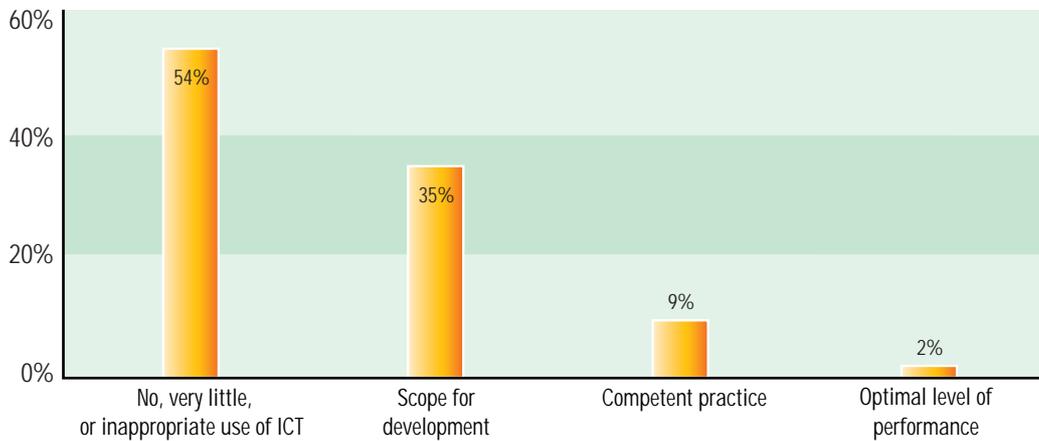
Building on the recommendation already made in chapter 3 on providing all teaching spaces in schools with ICT facilities, schools should also become active in promoting the integration of ICT in the subjects they offer on their curriculum. Regular audits of ICT facilities in schools should be undertaken, to include information on whether the available facilities are being used in subjects and, if so, in what ways. Strategies should be developed in schools, supported by the appropriate second-level support services, to help teachers to integrate ICT in their teaching practices. For example, schools might revise the functions of their ICT co-ordinators with a view to giving them a more educational or pedagogical role regarding ICT. Schools could also organise appropriate professional development opportunities for teachers, peer mentoring arrangements, and the development of targets for the acquisition of facilities.

6.4.3 Quality of provision

Inspectors were asked to state the quality of use of ICT in teaching and learning during those lessons observed as part of the subject inspections. Fig. 6.9 shows that 54% of inspectors' reports on lesson observations revealed limited or inappropriate use, or no use, of ICT in teaching and learning. This is supported by the observation that an ICT-related activity took place during only 18% of observed lessons (predominantly undertaken by the teacher) and that only 24% of post-primary teachers used computers in their teaching at least once a week.⁷⁷ In 35% of instances the inspectors reported that there was scope for development, while in 11% of instances they reported a competent or optimal level of performance.

77 See fig. 6.6.

Fig. 6.9: Inspectors' rating of the quality of use of ICT in teaching and learning observed



Base: All review schedules from Post-Primary Inspectors (n = 168)

One ICT review schedule arising from an inspection of English, which showed that ICT was used either sparingly or inappropriately in the lessons observed, mentioned that

none of the classrooms in which English teachers were based had been wired for broadband at the time of the inspection. The English teachers reported that the school's plan for using the networking grant was to create another computer room rather than to wire all general classrooms for internet access. One teacher, who regularly creates her own resources on her home laptop, stated that she would like to be able to show students particular websites to support her teaching, but that [the] management was more interested in centralising ICT resources.

A history lesson in which it was reported that there was scope for development of the use of ICT in the subject stated:

Teachers could make greater use of word-processing to prepare worksheets and involve students in researching suitable aspects of lessons at appropriate times from the websites. Clips of DVDs would help to give a visual dimension to the delivery of some lessons.

Only 2% of the inspectors' reports on lesson observations stated that optimal use of ICT in teaching and learning was observed. In a Latin lesson an inspector reported seeing

very good practice in this school, particularly in the case of the two main teachers of Latin. The facilities are very good and in the case of one of the lessons observed, the organisational skills were excellent since half of the class was conducted in the classroom and the second half in the computer room. This was managed very efficiently and no time was wasted. It is also understood that the Classical Studies teachers use ICT too. Evidence was presented which indicated this to be the case.

The social studies I, science and applied science groups of subjects achieved the highest ratings from inspectors for the quality of use of ICT in teaching and learning. An analysis of inspectors' review schedules that showed the use of ICT to be either "competent" or "optimal" revealed that:

- ICT was available in the classrooms, and teachers and students therefore had ready access to appropriate ICT hardware and software
- ICT-related activities were regular features of lessons, and students regularly engaged with the ICT during such lessons
- teachers were committed and enthusiastic about using ICT as part of their teaching strategies
- ICT permeated the subject area in the school
- ICT was being used to develop students' skills in a range of areas, for example writing, research and presentation skills.

The impact of ICT on teaching and learning

Inspectors were of the view that, when used effectively, ICT contributed to teaching and learning in varying ways. In the 56 (out of 311) lessons observed during subject inspections that incorporated an ICT-related activity, practically all inspectors reported that the activity contributed in some way to effective teaching and learning. The benefits that ICT can have for teaching and learning, as viewed by inspectors, included:

- using ICT means that information can be obtained almost instantly. The worldwide web, for example, contains a vast amount of easily accessible information. Such information can provide learners with different viewpoints and a wider understanding of issues
- ICT helps teachers to tailor teaching materials to suit the needs and ability levels of their students
- ICT acts as an incentive for students to learn. The technology can be effective in engaging them in their schoolwork
- ICT helps make learning more interesting. It increases levels of interest, for example through the use of colour, animation, and sound. It also facilitates multi-sensory learning through, for example, multimedia presentations, animation, and video
- ICT helps students to work at their own pace and level. Some programs, for example, have "intelligent" tracking systems that adjust the pace of learning. ICT contributes to the development of a personalised or step-by-step learning scheme. It provides opportunities for students to learn in different ways
- some programs affirm students' efforts, and this can encourage them in their learning. This facility also provides them with timely feedback on their work and provides them with an understanding of their progression
- ICT facilitates student-centred learning and can encourage students to take responsibility for their own learning. Some software individually identifies students' problem areas for extra reinforcement. ICT encourages self-directed learning

- ICT helps develop numerous skills, including critical thinking, literacy, numeracy, typing, presentation, creativity, and research skills. It also allows a higher level of analysis to take place than would otherwise be possible
- for some students the action of typing material can be an aid to understanding it
- ICT helps teachers and students to improve how they present information. It facilitates the creative and professional presentation of material and encourages students to take pride in their work
- ICT captures students' attention for significant time spans. The visual impact facilitated by ICT, for example, helps to hold their attention and helps them to retain information. The visual nature of working with ICT allows links to be made through visual imagery
- ICT helps increase the amount of work that can be taught in a lesson. Some programs are tailored to the curriculum
- effective use of ICT puts the teacher in a facilitative rather than an instructional role
- the use of ICT increases students' understanding of concepts and helps consolidate learning. In general, it makes learning more memorable and brings the subject matter to life
- using ICT can help raise students' self-esteem
- ICT helps to prepare students for life after school. Proficiency in ICT skills, for example, can improve job prospects
- effective use of ICT, especially in individual, pair and group work with computers, can lead to improved classroom discipline and improved management of learning.

Inspectors also emphasised some of the negative effects that ICT can have if it is not employed effectively. These included the following:

- students can become frustrated with ICT hardware and software in schools that have regular technical problems. This can discourage them from wanting to use school computers
- the security of personal work is important. Teachers and students dislike their work being interfered with, and the provision of secure storage space for work done is therefore crucial
- students can become irritated when there is no one-to-one access to computers in their lessons (that is, when they don't "get their turn"). In a lesson that involves interaction with the computer it is important that teachers endeavour to allow all students an opportunity to use the computer.

In summary, it is clear that ICT has the potential to positively influence teaching and learning. While there can be certain drawbacks in using the technology, these are outweighed by the potential it offers. It would seem incumbent on teachers to maximise the potential offered by ICT whenever and wherever possible.

6.5 ICT and special educational needs

The NCTE and NCCA provide a wide range of information for schools on the use of ICT in the area of special educational needs.⁷⁸

The evaluation attempted to gain an insight into the extent and quality of use of ICT in this area. An analysis of the survey of teachers found that 37% reported teaching students with special educational needs. Most reported using specific applications to aid the teaching process, while some reported using specialised technology devices. While inspectors' subject inspections and the case-study school visits allowed this finding to be explored further, it was the latter that proved more insightful.

It was clear from lesson observations associated with subject inspections that the use of ICT to help students with SEN was not prominent in the mainstream classroom. Inspectors reported being aware of students with special needs being present in 23% of the 311 lessons they observed during subject inspections. There was very little evidence, however, of ICT being used to support these students' learning. Indeed the majority of inspectors' comments stated that ICT was not used. When it was used it usually took the form of students working individually with specialised software on laptop computers. One review schedule pertaining to a science lesson, for example, stated that "one student with a sight problem used a laptop on which the diagrams were enlarged."

Case-study school reports provided evidence of the contribution of ICT to teaching and learning for students with special educational needs. The use of ICT in special education in all the case-study schools was organised to take place in small but discrete teaching areas with computer facilities or by withdrawing students from mainstream lessons to a classroom with such facilities. In many instances schools had developed a separate resource area for students with SEN that contained a number of laptop or desktop computers. In other schools they used laptops provided by the school (but stored centrally) for either individual support or within small groups. In most schools the extension of the network had included these small teaching areas.

The emphasis of students' engagement with ICT was mainly on supporting literacy. Software for reading, comprehension and spelling was most in evidence; there was less evidence of ICT support for numeracy. Teachers interviewed spoke of the positive impact ICT had on these students, as well as the impact of animation, music, and colour. They described how students felt comfortable with the technology and the positive and affirming effects on them of the self-assessment and achievement feedback aspects of software.

⁷⁸ The NCTE's *Planning and Advice for Schools* contains an advice sheet (number 28) for teachers getting involved for the first time in the purchase of ICT for special needs. Other sources of advice from the NCTE include the booklet *Information and Advice: Special Educational Needs and Information and Communications Technology* and the Special Needs Technology section of Scoilnet. The recently published NCCA document *Guidelines for Teachers of Students with General Learning Disabilities (2007)* contains advice on the ways in which ICT can facilitate and increase access to learning and communication for pupils with general learning disabilities.

6.6 Assessment

The evaluation found no evidence of ICT being used to assess students' academic progress at post-primary level. Furthermore, it found limited assessment being undertaken of students' ICT skills. Where this was done it was mainly confined to dedicated ICT lessons in Transition Year. Two of the case-study schools visited provided the ECDL course as part of their Transition Year programme; on completion of Transition Year students were accredited with the ECDL modules successfully completed. In another school the City and Guilds Level 2 keyboarding and word-processing examinations were used to assess and accredit achievement in ICT. The assessment of ICT skills was integrated in the formal assessment of tasks and assignments in the LCA, the ICT Vocational Specialism in LCA, and the portfolio assessment for LCVP.

Teachers used ICT mostly for administrative purposes in assessment. During the course of subject inspections, for example, 55% of teachers interviewed reported using ICT to simplify or streamline their assessment practices. Examples of the ways in which ICT was used in subjects included:

- using the internet to research topics or questions for inclusion in examination papers
- designing and preparing examination papers or worksheets
- entering the results of examinations in a student database system
- recording and storing students' results
- creating student profiles
- generating student reports
- using the computer for e-tests (for example on Scoilnet).

It is evident that the potential of ICT for use in assessment in many subjects is not being harnessed. This could include, for example, the use of ICT to assess, track and analyse students' progress by the use of appropriate software. Schools should consider exploiting the benefits of ICT in their assessment practices to go beyond purely administrative functions. The NCCA, in collaboration with the NCTE and SEC, should advise schools on how this can be achieved in different curricular areas. The outcome of the e-portfolio project at present being organised by the three organisations will contribute to the development of advice and guidelines.

6.7 Developing ICT in the classroom

6.7.1 Factors that constrain the development of ICT in the classroom

Inspectors commented in case-study school evaluation reports on the factors that constrained the development of ICT in schools. One of the most common factors was the reluctance of some

teachers to engage with the technology. This reluctance had a number of sources. One was the fact that some teachers seemed reluctant to change their own classroom practice and techniques that they had developed successfully over many years. It was also reported that some teachers were reluctant to facilitate any change to their role in the classroom, or to their relationship with their students. Teachers were also reported to be reluctant to engage with the technology because of their lack of technical knowledge, a general lack of enthusiasm, or unfamiliarity with, or fear of, the technology. It was generally noted by inspectors, however, that this reluctance was for the most part a skills-dependent issue. Like many others, one report mentioned that “teachers interviewed expressed a desire for training in both general and subject-specific skills.” Teachers who were considered to have good ICT skills tended to act as a positive influence on their colleagues, in encouraging others to engage with the technology.

Inspectors felt that the lack of ready access to ICT facilities in teaching areas in schools constrained the integration of ICT in the teaching and learning process. Many were also of the view that the time required to set up ICT equipment, or to move students to a computer room, was a significant erosion of teaching time and therefore acted as a constraint to integration. Many also referred to technical issues that can arise with equipment and to a lack of available technical support.

Inspectors also identified the following factors (presented in no particular order) as contributing to constraining the development of ICT in classrooms:

- limited finance, the result being insufficient or out-of-date hardware and software
- curricular pressure of subjects
- packed timetables, for example the issue of restricted access to the computer room and the inconvenience experienced by some teachers in having to take students from their base classroom to a computer room. The timetable was sometimes viewed restricting for conducting cross-curricular collaborative and project work
- lack of time on the part of the ICT co-ordinator to research or install ICT infrastructure, and lack of time available to teachers to research and engage with the technology
- lack of training available to and availed of by teachers
- the amount of work involved in adapting or generating relevant subject-specific materials
- a lack of awareness in the wider school community of the value of ICT as a learning tool
- space restrictions in classrooms
- the absence of planning
- the existence of an examination-driven curriculum, coupled with the fact that school assessment procedures, for the most part, do not reflect an emphasis on using ICT



- the fact that a teacher can be regarded as an excellent teacher without the use of ICT, so there is a disincentive to risk change.

6.7.2 Factors that facilitate the development of ICT in the classroom

Inspectors identified the following factors (presented in no particular order) as facilitating the development of ICT in classrooms:

- the availability of grants and funding (provided by various sources, for example DES, parents, board of management)
- the positive attitude, encouragement and vision of the school management
- teachers' enthusiasm and interest, teamwork and collegiality, and a positive and open attitude among the teaching staff
- the needs of the curriculum, Transition Year, LCVP and LCA in the senior cycle, which encourage the use of ICT in the classroom

- professional development training for teachers (whether provided by the NCTE or ICT advisory service as part of in-service support for revised syllabuses, organised at the school level or acquired as part of academic courses)
- the availability of technical support that contributes to making the technology more reliable
- professional dialogue with other teachers who are using the technology (for example facilitating departmental meetings, allowing discussion and development to take place at the departmental level)
- access to appropriate ICT hardware, software, and the internet (for example availability of a computer room, availability of laptop computers and mobile data projectors for use in general classrooms, internet access and broadband)
- whole-school evaluations, subject inspections, and visits from other professionals
- the professionalism and expertise of the ICT co-ordinator
- study visits to other schools that are advanced in using ICT
- the availability of computers in the staff room
- an awareness among staff members of what ICT facilities are available to them in their school
- easy access to resources on the internet, such as the NCTE and Scoilnet
- participation in ICT for school initiatives, for example the NCTE Laptops Initiative
- pressure from students and peers
- the fact that ICT holds students' attention and so contributes to better discipline.

Foremost among the facilitating factors was the enthusiasm and motivation of staff members to engage with ICT. This engagement related both to the development of their own skills and to their motivation to integrate ICT in teaching and learning. It was clear from discussions with both teachers and principals in case-study schools that they shared the desire to increase the integration of ICT in classroom teaching. The level of DES, NCTE and other funding was also viewed as an important facilitating factor. Most schools, however, made it clear that they had raised extra funds above and beyond those provided by the DES and NCTE to develop their ICT infrastructure. (See also chapter 3.)

When asked to express their level of agreement with the statement that these were facilitating factors, teachers expressed the highest level of agreement with having a computer in the classroom. All respondents either "agreed strongly" (almost 70%) or "agreed" with the statement that having a computer in the classroom facilitated the development of ICT.

6.8 Findings and recommendations

6.8.1 Main findings

Teachers' ICT skills

- Significant numbers of teachers lack intermediate (or better) ICT skills in a wide range of areas. Of those who are proficient in ICT skills, many do not use them in their teaching practice. It can be assumed that other factors, such as access to computers and teachers' motivation, may influence the transfer of teachers' competence in individual applications to classroom practice. Recently qualified teachers had a higher perception of their ICT skills than more experienced teachers.

Dedicated ICT lessons

- Dedicated ICT lessons are more prevalent among first-year class groups, and are provided less frequently as students progress towards the Junior Certificate. The majority of schools concentrate on providing dedicated ICT lessons in their Transition Year, LCVP, or LCA. The most popular topics taught in these lessons are word-processing, the internet, spreadsheets, and presentations.
- The computer studies subject in the junior cycle was provided by only 13% of the schools surveyed, while at Leaving Certificate level it was provided by 23%. The majority of schools surveyed provided ECDL courses for their students.

Use of ICT in teaching and learning

- The principals of case-study schools reported that not all ICT resources provided to subject teachers were being used in teaching and learning. The factors inhibiting their use included problems with access and scheduling, inadequate teacher training and support, lack of confidence or interest on the part of the teacher, and inadequate facilities.
- Interviews with teachers in case-study schools found that the main use for ICT in all subjects was the development of students' research, investigation, writing and presentation skills. ICT was least likely to be used to develop teamwork and collaborative skills.
- Schools give priority to furnishing specialist classrooms with ICT facilities over general classrooms.
- Of the 311 lessons observed by inspectors during subject inspections, 56 (18%) involved an ICT-related activity. Students' interaction with the technology was observed in only about a quarter of these. The most common ICT-related activity observed was the use of a computer and data projector to make a presentation to a class group.

- Only 11% of inspectors' reports on 311 lesson observations during subject inspections reported that there was competent practice, or that ICT was effectively integrated in the teaching and learning process.
- The survey of teachers found that the most popular setting in which ICT was used was whole-class teaching in a dedicated computer room.
- In relation to the use of ICT in teaching, the survey of teachers showed that 55% used computers, 50% used applications, and 34% used the internet.
- The Transition Year, LCVP and LCA programmes greatly encourage the integration of ICT in teaching and learning.
- High levels of integration of ICT were found in the science and applied science subjects, Mathematics and the subjects in the social studies I group. A number of subjects were identified as being regular users of ICT, such as Guidance and foreign languages. Subjects were also identified that rarely made use of ICT, the most notable being Irish.
- The provision of continuing professional development by support services, particularly in syllabus revision, has a positive effect on the level of integration of ICT in teaching and learning for the subjects concerned. The "ICT-proofing" policy being implemented by the NCCA for subjects that are being reviewed or revised is a positive contribution to integrating ICT in teaching and learning.
- Principals, teachers and students stated that ICT has the potential to improve students' motivation and engagement and to make learning more exciting. In particular, principals and teachers stated that it contributes to improved teaching materials and methods and to improved learning outcomes.
- While nearly two-thirds of students reported using a computer to help them with their homework, only 19% of these reported that they did this at least once a week.

ICT in special education and assessment

- ICT is widely used to support schools' provision of special education. The focus of students' engagement with ICT in special-education settings is mainly on supporting literacy.
- No clear evidence was found of ICT being used in the assessment of students' academic progress. Furthermore, the evaluation found limited assessment being undertaken of the development of students' ICT skills.

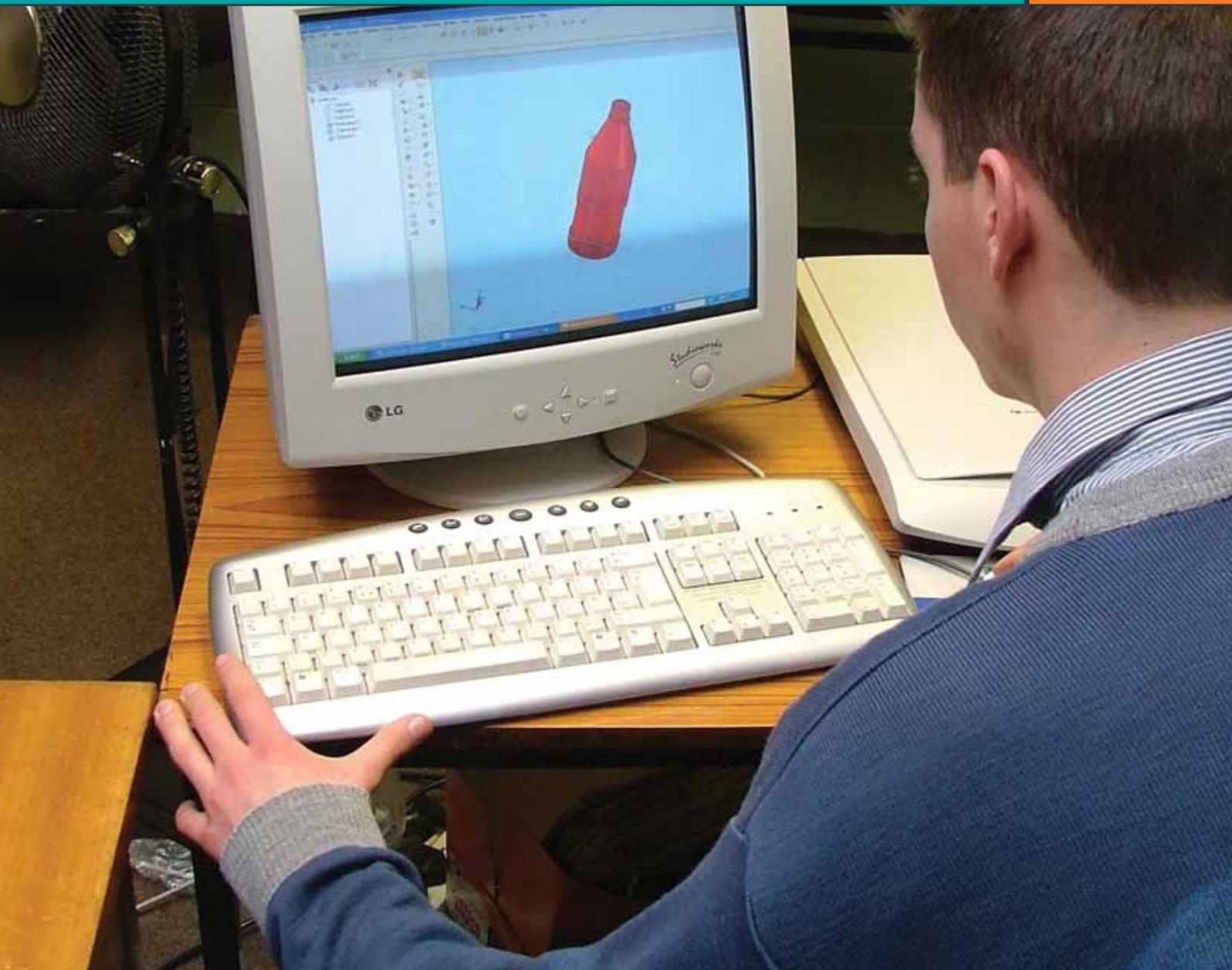
Students' ICT skills and ICT work

- Students use computers most frequently to find information using the internet. They also use computers regularly for word-processing, games, and e-mail. The majority of students are able to perform many basic operations by themselves, for example saving, printing, deleting, opening and editing documents. However, they require assistance in performing more complicated tasks, such as moving files or creating multimedia presentations.
- Students become discouraged from using computers if they continually have technical problems. They also become discouraged if they don't "get their turn" on the computer and if their personal work is interfered with.
- The quality of students' ICT work observed in schools was described in very positive terms by inspectors. Students were always capable of discussing their work in a competent and confident manner.

6.8.2 Recommendations

Recommendations for policy-makers and policy advisors

- Teachers need to be supported in meeting the challenge of effectively integrating ICT in their classroom practices so that Irish students are placed at the forefront of advances in teaching practices and learning techniques.
- Consideration should be given to ensuring that teachers are provided with opportunities to develop skills that are directly applicable to the use of ICT in the classroom. This should be addressed in a strategic way through a combination of pre-service, induction and in-service training.
- Consideration needs to be given to either revising or removing the junior cycle and Leaving Certificate Computer Studies syllabuses from *Rules and Programme for Secondary Schools*. Such a move would be complemented by the "Framework for ICT in Curriculum and Assessment" at present being developed by the NCCA. Notwithstanding these developments, schools would still need to be advised about what constitutes an appropriate education in ICT in the senior cycle. The NCCA, in collaboration with the NCTE, is best placed to advise schools on this issue. It is important, as Irish society moves increasingly into a digital-information environment, that the curriculum facilitates the development in students of relevant skills in information-competence.
- The NCCA, in collaboration with the NCTE and SEC, should advise schools on how ICT can be used effectively in assessment procedures and practices. The outcome of the e-portfolio project at present being organised by the three organisations will contribute to the development of advice and guidelines.



- Teacher education departments in third-level colleges should consider giving priority to the study of ICT in education for students following a postgraduate diploma in education course. Indeed such studies should be given priority in any teaching qualification provided by teacher educators.

Recommendations for schools

- Schools should endeavour to balance the ICT experience they plan to provide for their students within a particular programme throughout the life span of that programme (for example the junior cycle or senior cycle). At present such exposure seems to be concentrated in the first year of the junior cycle and, in the case of most students, in the Transition Year of their senior cycle.
- In providing a programme of discrete ICT lessons, schools should first attempt to ascertain students' existing ICT skill levels and thereafter develop or implement a syllabus that would expand their knowledge and their repertoire of skills.

Integrating ICT in teaching and learning

- Schools should be active in promoting the integration of ICT in the subjects they offer.
- There should be continuous efforts within schools to improve the level of teachers' access to ICT equipment.
- Management should undertake regular audits of ICT facilities in all subjects, to include information on whether available resources are being used and how they are being used.
- Teachers with good ICT skills should act as mentors to colleagues whose ICT skills are not as well developed. Good practice within schools should be disseminated among members of the staff at every opportunity.
- Teachers should regularly review their use of ICT with a view to expanding their repertoire of teaching strategies, including opportunities for interaction by students with the technology. This should include exploring the use of as wide a range of resources and applications as possible, including Scoilnet, educational software, peripherals, e-mail, presentation software, and the internet.
- Teachers should exploit the potential of ICT to develop a range of students' skills, including research and investigation, writing and presentation, communication, teamwork and collaborative skills, and the higher-order skills of analysis, evaluation, and problem-solving.

ICT in special education and assessment

- When using ICT as a teaching aid for students with special educational needs, schools should endeavour to ensure that it is being used to support the widest possible range of students' needs. It should be used, for example, to support the development of students' numeracy skills, as well as their literacy skills.
- Schools should exploit the benefits of ICT in their assessment procedures and practices beyond purely administrative functions. This could include using ICT to assess, track and analyse students' progress through the use of appropriate software. Consideration could be given to assessing students' ICT skill levels also.



Chapter 7

Main findings and recommendations

Part 4 Summary of findings and recommendations



7.1 Introduction

This chapter summarises the main findings and recommendations of this report. The findings show that, while strides are being made in certain areas of schools' ICT infrastructure, ICT planning and the integration of ICT in classroom practices, there is still significant scope for development, integration and expansion of the use of the technology in practically all facets of school life.

The recommendations are divided into two categories. The first is directed at policy-makers and policy advisors; these include such bodies as the Department of Education and Science, the National Council for Curriculum and Assessment, and the National Centre for Technology in Education, as well as other relevant support services. The recommendations are aimed at making significant improvements in the ICT capacity of schools as well as improving standards of teaching and learning. The adoption of these recommendations would also facilitate schools in their endeavour to implement those recommendations specifically aimed at schools.

The second category of recommendations is directed at schools, both primary and post-primary. These recommendations seek to encourage greater and more effective use of ICT in the teaching and learning process. The recommendations suggest how schools could make better use of the ICT infrastructure already available to them and how this ICT infrastructure could be improved. They also consider how the quality of schools' ICT planning and the contents of their ICT plans could be improved as well as ways in which the plans could be implemented more effectively.

School management authorities, boards of management, principals, schools' ICT co-ordinators and subject teachers can all play a role in the implementation of these recommendations. Schools could

also seek to involve the wider school community, such as parents and local businesses, where possible. They should adopt a strategic approach to implementing the recommendations. This could involve, for example, schools establishing their level of development with regard to ICT use, perhaps by making use of the ICT planning matrix provided by the NCTE. An ICT plan should then be developed that would emphasise those aspects that warrant priority for immediate action. In implementing the recommendations schools should seek advice and support from relevant support services.

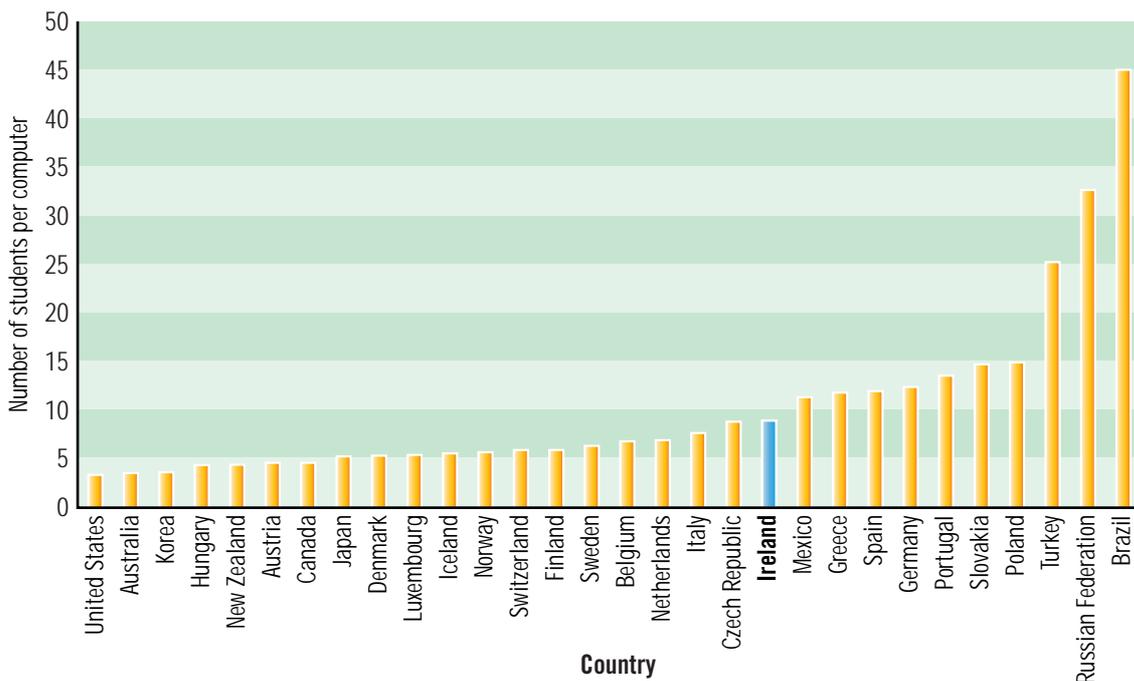
7.2 Main findings

7.2.1 Infrastructure

Funding for ICT

The evaluation showed that the average student-to-computer ratio (SCR) ranged between 8:1 and 12:1 in primary schools and between 5.2:1 and 8.4:1 in the post-primary schools. These ratios were in line with the findings of the surveys conducted by NCTE which show that the average SCR is 9.1:1 for primary schools and 7:1 in post-primary schools. Data from the OECD shows that in comparison, Ireland lags behind other countries in the provision of computers to schools. Countries that have taken the lead in this area are aiming for or achieving a SCR of 5:1 or less. (OECD, 2003).

Fig. 7.1 International student-computer ratios from PISA 2003



Source: OCED PISA 2003 Database, Table D5.1 available in *Are Students Ready for a Technology-Rich World: What PISA Tells Us*. (OCED, 2006a).

The evaluation found that schools, in the main, made effective use of the grants provided by the Department of Education and Science to develop their ICT systems. It was also found that schools generally spent considerably more on ICT than the sums made available through such grants. This could have the unintended outcome of exacerbating the digital divide in society, as some schools may not be in a position to raise private funding.

Technical support

One of the major burdens on schools' budgets with regard to ICT was found to be their spending on technical support and maintenance and dealing with computer obsolescence. The lack of technical support and maintenance is a major impediment to the development of ICT in schools.

Location of computers in schools

The evaluation showed that at primary level the computer room is generally a feature of larger schools. However, in response to their national survey, teachers stated that access to computers was superior when they were located in classrooms.

While practically all post-primary schools were found to have a dedicated computer room, many were found to experience difficulties with regard to its timetabling. It was clear, for example, that certain cohorts of students were given priority when schools timetabled access to the computer room. Typically, students in Transition Year and those following the LCA and LCVP programmes experienced better access to the computer room. The evaluation also showed that in post-primary schools a greater permeation of computers occurred in specialist rooms, such as science and applied science subject rooms, than in general classrooms.

Peripherals

Printers were found to be the most widely used ICT peripheral in both primary and post-primary schools. Scanners and digital (still) cameras were the next most widely used, with digital projectors being more common in post-primary schools than primary schools. Interactive whiteboards were generally uncommon in both primary and post-primary schools.

Use of applications

Some teachers were found to make effective use of computer applications to facilitate teaching and learning. (This was usually dependent on the class groups being taught at primary level and on the subject being taught at post-primary level.) The use of computer applications was prevalent in the area of special-needs education at both primary and post-primary level, but many teachers were uneasy about their ability to match applications (and other specialised technology) with students' needs. It was also clear that many teachers in both primary and post-primary schools were unaware of the range of peripherals and applications already available to them in their school.

Dedicated ICT facilities for teachers

Schools that made dedicated computer facilities available to teachers reported that it led to improvements in the quality of the teaching resources used in classrooms. This was found to be more a feature of the post-primary level and included such strategies as making dedicated equipment available in staff rooms or work rooms or in a teacher's classroom. Many primary schools did not have a staff room, and so this option was not open to them. A small number of schools provided ICT facilities for teachers' home use.

Local ICT advisory service

The level of awareness among teachers of the local ICT advisory service was found to be quite low: fewer than half the respondents in both the primary and the post-primary national survey of teachers reported being aware of the service. Awareness was found to be higher, however, among ICT co-ordinators than among other teachers. The use of the ICT advisory service among those who were aware of it was also found to be low: at primary level only 22% of all respondents reported having used the service, while at post-primary level the corresponding figure was 15%.

7.2.2 ICT planning

Responsibility for ICT planning

The evaluation found that the responsibility for ICT in a school can lie with an ICT steering committee, the principal, the deputy principal, an ICT co-ordinator, or a combination of these personnel. ICT steering committees were not prevalent in schools, while named ICT co-ordinators were more common in post-primary than primary schools. It was clear that greater efficiency was achieved where a named person had responsibility for ICT within a school and where their role was clearly defined. Few ICT co-ordinators had opportunities to work with colleagues regarding relevant ICT pedagogical issues.

Schools' ICT plans

The majority of primary schools surveyed (71%) but fewer than half the post-primary schools (46%) were found to have a written ICT plan. These plans tended to concentrate more on infrastructural issues than on how ICT can be used to enhance teaching and learning. This finding was supported by inspectors' analysis of ICT plans in the case-study schools visited. In schools that were found to engage in ICT planning there was usually a greater emphasis on whole-school ICT planning than on such planning at the level of the individual teacher.

Acceptable-use policy (AUP)

Most schools were found to have an acceptable-use policy (83% of primary schools surveyed, 87% of post-primary schools surveyed). This is an indication of the seriousness that schools attach to the risks associated with use of the internet and of the requirements of the Schools Broadband Access Programme.

Teachers' use of ICT in planning and preparation

The majority of teachers (both primary and post-primary) were found to make some use of ICT in their lesson planning and preparation work. Newly qualified teachers were more likely to use ICT for this purpose than their more experienced colleagues. However, fewer teachers were found to plan for the actual use of ICT in teaching and learning. At post-primary level, planning for the use of ICT in teaching and learning varied among subjects. The Transition Year, LCVP and LCA programmes were all found to encourage increased planning for the use of ICT in teaching and learning. Teachers of these programmes also regularly reported that their involvement encouraged them to use ICT in their work with other class groups.

Future priorities for schools in ICT planning

Principals and teachers identified the provision and maintenance of hardware in schools and the provision of teacher training in ICT as being strategically important with regard to the development of ICT in their schools. Generic programmes of professional development because of their very nature were found to attract large numbers of teachers.

7.2.3 ICT in teaching and learning

Teachers' ICT skills

In responses to their survey, only 30% of primary teachers and 25% of post-primary teachers reported themselves to be comfortable users of ICT; fewer again felt they knew how to apply it effectively in their teaching. Recently qualified teachers had a higher perception of their ICT skills than more experienced teachers.

Use of ICT in teaching and learning

While it is recognised that not all lessons lend themselves comfortably to the use of ICT, or indeed would benefit from it, it can be said that there is a limited integration of ICT in classrooms. At primary level inspectors reported evidence of the use of ICT to facilitate teaching and learning in 59% of classroom observations carried out as part of WSEs. However, they observed ICT actually being used in only 22% of observed lessons. Furthermore, students in junior classes were found to experience a narrower range of ICT activity in their classrooms than those in senior classes. Nearly a quarter of all inspections revealed a competent or optimal level of performance in relation to the general use of ICT in the classroom.

At post-primary level only 18% of the 311 lessons observed by inspectors involved an ICT-related activity. Students' interaction with the technology was observed in only about a quarter of these instances. The most common ICT-related activity observed was the use of a computer and data projector to make a presentation to a class group. Inspectors judged that effective integration of ICT in teaching and learning was occurring in approximately half of the lessons in which they observed the use of ICT, i.e. in approximately 11% of all lessons observed.

Teaching and learning that makes use of ICT, takes a number of different forms in schools. Individual students working at a computer in a classroom in rotation is the most frequently used method at primary level. At post-primary level the most popular approaches include whole-class teaching in a designated computer room as well as whole-class and individual work on computers in general or specialist classrooms.

Dedicated ICT lessons

At post-primary level, dedicated ICT lessons were found to be more prevalent among first-year class groups and their provision declined as students progressed through the junior cycle. The majority of schools were found to concentrate on providing students with dedicated ICT lessons in their Transition Year or for students following the LCVP or LCA programmes. The majority of post-primary schools provided ECDL courses, while slightly more than a quarter provided FETAC-accredited modules. The most popular topics taught in dedicated ICT lessons were word-processing, the internet, spreadsheets, and presentations.

ICT and the curriculum

Where ICT is used in primary classrooms it predominates in core curricular areas such as English and Mathematics, and in Social, Environmental and Scientific Education (SESE). Furthermore, it is mainly used for the development of students' writing, reading and numeracy skills; there is limited use of the technology in the development of higher-order thinking skills, creative or social skills, independent working skills, or communication skills.

At post-primary level, high levels of integration of ICT were found in the science and applied science subjects as well as in the subjects of the social studies I group (History, Geography, Art, Craft and Design, Music). Subjects were also identified that rarely made use of ICT, the most notable being Irish. The main use for ICT in all subjects was the development of students' research, investigation, writing and presentation skills. It was least likely to be used to develop teamwork and collaborative skills.

Students' ICT skills

The survey of fifth-class students showed that many did not have the competence to complete basic tasks on the computer. While most reported that they were able to perform many of the most basic tasks, such as turning a computer on and off and opening or saving a file, more than 30% reported that they were not able to print a document or to go on the internet by themselves. Almost half (47%) reported not being able to create a document by themselves. The majority were unaware of how to create a presentation (72%), use a spreadsheet (86%), or send an attachment with an e-mail message (88%). Competence in the use of ICT is limited, for the most part, to basic ICT skills, centred on the use of word-processing.

In their survey, fifth-year students reported confidence in performing many basic computer operations by themselves, for example saving, printing, deleting, opening and editing a document.

It was found that, with some assistance, they could generally perform more complicated tasks, such as moving files, copying files to external storage devices, and writing and sending e-mail. A relatively low proportion reported being able to create a multimedia presentation. Students required most help in attaching a file to an e-mail message, constructing a web page, or dealing with computer viruses. While post-primary inspectors generally commented positively on the ICT work that they observed, they were also critical of the narrow range of work produced.

ICT and education for students with special educational needs

ICT is widely used to support schools' provision of special education, more often by members of the special-education team than by mainstream class teachers. The emphasis of students' engagement with ICT in special-education settings is mainly on the teaching of literacy.

ICT and assessment

No clear evidence was found of ICT being used in the assessment of students' academic progress. The evaluation also found limited assessment being undertaken by schools of the development of students' ICT skills. Furthermore, there was limited evidence of teachers engaging in the assessment of ICT-related activity in their classroom, or of its impact on teaching and learning.

7.3 Main recommendations for policy-makers and policy advisors

7.3.1 ICT infrastructure

Improving schools' ICT infrastructure

The level of ICT infrastructure in schools needs to be improved. To ensure adequate access by students to ICT, Ireland should strive to reduce its student-computer ratio. A reduction in Ireland's SCR would have the effect of facilitating an increased permeation of ICT in all teaching and learning spaces. In this context, it is worth noting that countries that have taken the lead in this area, including Japan, Canada, Austria, New Zealand, Hungary, (South) Korea, Australia and the United States, are aiming for or achieving a SCR of 5:1 or less.

Ireland should be working towards equipping not just all schools but all classrooms with an appropriate level of ICT infrastructure. Consideration should be given to equipping all classrooms with, at the least, a computer for teachers' use, broadband internet access with adequate bandwidth, and a fixed data projector and screen for presentations.

There is some evidence that growing numbers of schools are installing interactive whiteboards. While these whiteboards have considerable advantages, the cost of this technology is prohibitive and its use is heavily dependent on training and the presence of an ICT culture in schools. As



recommended above, priority should be given to equipping each classroom with a computer and data projector. In due course, consideration should be given to how interactive whiteboards can be made available to schools over time.

ICT technical support and maintenance

Provision needs to be made for ICT technical support and maintenance for schools. While an increase in the level of ICT infrastructure in schools will go some way towards increasing their ICT capacity, this is not the only criterion for ensuring an increased impact of the technology on teaching and learning. ICT maintenance in schools needs to be addressed in a co-ordinated fashion at the system level, so that all schools can benefit from having a secure and reliable infrastructure that will facilitate the integration of ICT throughout the school.

A strategy is required to ensure that a comprehensive ICT maintenance and support service is available to schools. A range of models whereby this service could be delivered needs to be explored. These models could include clustering schools for the purpose of taking out maintenance contracts with commercial IT companies, national or regional contracts for technical support for schools, or other options. The effectiveness of these models could be explored on a pilot basis

initially, so as to identify the most cost-effective and efficient way in which the necessary support could be provided to schools.

ICT upgrading

Funding for ICT infrastructure should not only provide schools with the capacity to acquire ICT facilities but also to regularly upgrade these facilities and to dispose of obsolete computers and other equipment in a planned way. This increased funding may be delivered by way of increased capitation grants or direct grants. As recommended in section 7.4.1 below, schools should plan to use the available funding to acquire ICT facilities, to provide for maintenance of their ICT systems and to manage their computer obsolescence more effectively. Advice regarding the spending of schools' ICT budgets could be provided by the NCTE and other relevant support services.

Local ICT advisory service

It is clear from the evaluation that the impact of the local ICT advisory service is limited. The technical dimension of ICT advisors' role in an education centre could be more adequately fulfilled by other means as discussed under *ICT technical support and maintenance* above. Furthermore, the current pedagogical support role of the advisory service could be more appropriately provided by the relevant support services (for example the Primary Curriculum Support Programme and the Second-Level Support Service, including the various support programmes for second-level subjects) in liaison with the ICT school co-ordinators. With an effective ICT maintenance system in place, the pedagogical role of school-based ICT co-ordinators could be enhanced and supported with appropriate training.

7.3.2 Professional development needs of teachers

ICT in teacher education

There needs to be an increased emphasis on the application of ICT in teaching and learning in teacher education during pre-service, induction and in continuing professional development. The evaluation found that a lack of appropriate training for teachers acted as a major barrier to the effective use of ICT in schools.

It is recommended that teacher education departments in third-level colleges should provide student teachers with the skills necessary to effectively use ICT in teaching and foster in them a culture of using ICT in their work. The colleges should also develop appropriate postgraduate courses to offer to the teaching profession in general, for example a higher diploma for school ICT co-ordinators. The resource demands of these developments need to be examined by the colleges and the appropriate funding bodies.

Continuing professional development for teachers

The IT 2000 initiative included the implementation of a national professional development initiative for teachers. This initiative attracted significant numbers of teachers at the time of its launch and its



main emphasis was on the cultivation of basic ICT skills among teachers. While opportunities continue to be provided for teachers to engage with relevant professional development courses in ICT, consideration should now be given to expanding and extending significantly the current range of courses on offer. The main emphasis of this expanded initiative should be the development of teaching skills that facilitate the integration of ICT in teaching and learning. A major element of the initiative should have a subject-specific focus and should be developed and implemented in conjunction with the existing school support services.

School support services

School support services need to give priority in their work with schools to the integration of ICT in the teaching and learning process. Support services should work more closely with schools, and with schools' ICT co-ordinators in particular, to determine the training needs of staff members and assist them in organising appropriate training programmes. Using ICT in lessons requires alternative teaching approaches and classroom practices. Particular attention, therefore, should be given to organising professional development courses that concentrate on the development of teaching methods that encourage the use of ICT.

Support services should also ensure that examples of how ICT can be used to facilitate teaching and learning are included in all general professional development programmes that they provide. Course organisers and presenters should take account of the wide range of ICT abilities and experience commonly found in groups of teachers when organising courses, and should employ strategies for working with mixed-ability groupings.

Support for setting up an association of ICT co-ordinators

ICT co-ordinators should be supported in setting up an association or network of schools' ICT co-ordinators. Such a forum would allow co-ordinators to engage with a "community of practice" and to learn from one another.

7.4 Main recommendations for schools

7.4.1 ICT infrastructure in schools

Budgeting for ICT

Schools should move promptly in making use of any ICT grants they receive. Given the importance of technical support and maintenance in ensuring the continued operation of their ICT system, schools should endeavour to allocate a separate budget annually for the maintenance and development of their ICT systems. Furthermore, schools need to manage their computer obsolescence more effectively.

Location of ICT resources in schools

It is recommended that, as resources permit, schools should work towards providing all teaching and learning spaces with ICT facilities. This should include general classrooms and should not be confined to specialised rooms, as tends to be the case at present. As an interim measure schools could consider setting up a mobile ICT facility, comprising, for example, a laptop computer (or computers), a printer, and a digital projector.

Schools with computer rooms should ensure that they are as fully accessible as possible. This could be achieved by a combination of effective timetabling and the adoption of a system that allows teachers to book the room as necessary.

Schools should also explore ways of facilitating students with access to ICT facilities outside lesson times. The setting up of a computer club, for example, could contribute to making computer facilities more accessible to students.

Developing ICT resources in schools

As opportunities arise, schools should develop the range of ICT peripherals and software available to facilitate teaching and learning. Furthermore, efforts should be made to promote awareness within schools, particularly among staff members, of the availability of such resources. Schools should also carry out a regular ICT needs analysis in the area of special educational needs. This would help ensure the best match possible between specialised technology and software and the needs of students with special educational needs.

ICT facilities for teachers

Schools should endeavour to provide staff members with adequate access to ICT facilities for the purpose of planning and preparing for their teaching. Many schools have already done this by providing such facilities in their staff rooms or in work rooms. It should be remembered that the provision of facilities in individual classrooms could also provide teachers with access to ICT for planning and preparation purposes and not just for teaching purposes. Consideration could also be given to acquiring a small number of laptop computers, or other mobile facilities, that could be used by members of the staff at school or at home, as necessary.

7.4.2 Planning for ICT in schools

ICT co-ordinator

To ensure efficiency in the organisation and capacity of a school's ICT system, one member of the staff in every primary and post-primary school should take the lead in the management and co-ordination of ICT. It is also suggested that the duties of this staff member be incorporated in the school's schedule of posts of responsibility. The duties attaching to such a post should be clearly specified and should include the following:

- co-ordinating the production and development of the ICT plan
- identifying training needs and facilitating staff training
- developing strategies for the integration of ICT throughout the curriculum
- liaison with the senior management and advising on ICT strategies
- evaluating the use of ICT in the school and encouraging greater use by teachers and students
- liaison with ICT maintenance personnel
- developing and maintaining a school learning platform and web site.

ICT steering committee

Schools should consider convening an ICT steering committee, which could assist in managing the development of the ICT plan and in monitoring and reviewing its continuing implementation.

ICT plan and an acceptable-use policy

Schools should have an ICT plan and an AUP, both drawn up in consultation with all relevant stakeholders and both updated regularly. The plan should have a clear emphasis on the integration



of ICT in teaching and learning throughout the curriculum. Ideally it should include guidelines for teachers in setting out appropriate learning objectives for each class level in relation to the use of ICT in supporting the implementation of the curriculum.

ICT and individual teachers' planning

All teachers should exploit the benefits to be gained from ICT in their lesson planning and preparation. They should endeavour, for example, to make more use of Scoilnet. Ready access by teachers to computer facilities and the internet would obviously aid this process. Furthermore, teachers should plan for the integration of ICT in all aspects of their teaching, as appropriate. As resources become more readily available, so too should their use in the classroom.

Using support services

Schools should monitor the ICT training needs of their staff and develop and implement professional development plans as appropriate. Professional development opportunities for teachers should

concentrate on the integration of ICT in teaching and learning. Schools should utilise the services of their local education centre, and other relevant school support services, as fully as possible, in planning and delivering professional support to teachers, and in planning and developing their ICT infrastructure.

7.4.3 ICT in teaching and learning

Integrating ICT in teaching and learning

The process of school and teacher self-review should support the effective integration of ICT throughout the school curriculum. As schools review and seek to improve the quality of teaching and learning in curricular areas and subjects, they should examine their current and potential use of ICT. School self-review should include regular audits of ICT facilities in all classrooms and subjects, and should gather information on how effectively existing available resources are being used.

Schools should endeavour to adopt mechanisms to facilitate the sharing of good practice among staff members. For example, teachers with good ICT skills and who make effective use of ICT in their own classrooms could act as mentors to colleagues whose ICT skills are not as well developed.

Schools should endeavour to provide all their students with an appropriate and equitable level of experience of ICT at all class levels at primary level and at both junior cycle and senior cycle at post-primary level.

Teachers should regularly review their use of ICT with a view to expanding the settings in which it can be used and their repertoire of teaching strategies, including opportunities for students' engagement with the technology. This should include exploring the use of as wide a range of resources and applications as possible, for example educational software, peripherals, e-mail, presentation software, and the internet.

Teachers should also exploit the potential of ICT to develop as wide a range of students' skills as possible, including research and investigation skills, writing and presentation skills, communication skills, teamwork and collaborative skills, and the higher-order skills of problem-solving, analysis, and evaluation.

If schools are providing a programme of discrete ICT lessons at post-primary level, the content of the programme should reflect closely the existing level of the students' ICT skills. Any syllabus developed by the school should have the effect of expanding on the students' knowledge and their repertoire of ICT skills.

ICT and students with special educational needs

Schools should exploit more fully the potential of ICT to support the learning needs of students with special educational needs. Currently, ICT is used mainly to support the acquisition of literacy, but the technology has the potential for much wider application in special education settings and for supporting students with special educational needs within mainstream classrooms.

ICT and assessment

Schools should develop strategies for evaluating the impact of ICT at different levels in the school, so that staff members are confident in assessing its influence on teaching and learning.

Schools should exploit the benefits of ICT in their assessment procedures and practices beyond purely administrative functions. This could include using ICT to assess, track and analyse students' progress through the use of appropriate software. Consideration could also be given to assessing students' ICT skill levels at particular times during their schooling.



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NCTE ICT planning matrix

The ICT planning matrix is designed to help schools establish their level of development with regard to the use of ICT. It includes a wide range of issues for consideration in the development of a school's ICT plan. Within the categories of the matrix, issues are discussed in accordance with certain criteria, and these are graded into three stages of integration: initial, intermediate, and advanced.

The matrix offers a clear means of assessing a school's ICT status. Schools may find that they are primarily in the advanced stage as regards their ICT resources and infrastructure but are in the initial stage when it comes to ICT and the curriculum. Having established that this is the case, such a school should give priority to the integration of ICT throughout the curriculum.

The integration of ICT is not simply a linear process, with a clear beginning, middle, and end. Every school needs to analyse its present position with regard to ICT integration and to develop a plan that will allow it to progress to the next stage.

It is recommended that each school work through the ICT planning matrix to identify its strengths and weaknesses with regard to the current use of ICT within the school. Having established their strengths, they should then grade their weaknesses under the five headings and devise a realistic plan to progress to the next level. Such a process should be monitored regularly to ensure that progress is being made. The five categories are:

- Management and planning
- ICT and the curriculum
- Professional development of staff members
- School's ICT culture
- ICT resources and infrastructure.

Management and planning

Is your school at the initial, intermediate or advanced stage for ICT management and planning?

Initial	ICT plan is developed
Intermediate	ICT plan is regularly updated
Advanced	ICT planning is considered an integral part of general school planning

Initial	ICT plan is developed by one or a few individual teachers
Intermediate	All staff members are given the opportunity to make an input to the ICT plan
Advanced	A team approach is adopted for ICT planning and integration

Initial	No teacher is co-ordinating the integration of ICT within the school
Intermediate	One teacher or a group of teachers informally assume responsibility for ICT in the school
Advanced	There is a designated co-ordinating teacher

Initial	The ICT plan concentrates heavily on computer hardware and the acquisition of basic skills
Intermediate	The school enlists the support of the local ICT advisor or ICT support group network
Advanced	The school ethos encourages the exploration of new approaches to ICT integration

Initial	An audit of ICT resources has not been carried out
Intermediate	The process of identifying relevant software and internet resources in all subject and special-needs areas has begun
Advanced	An annual audit and needs assessment of ICT infrastructure is conducted, in terms of the curriculum needs of all classes, subject areas, and special needs

Initial	The extent and level of ICT use is decided by each teacher individually
Intermediate	The principal is active in integrating ICT throughout the school
Advanced	The impact of ICT in all areas of teaching and learning is regularly reviewed

Initial	The ICT plan concentrates on equipment rather than on the school's usage policy
Intermediate	Health and safety standards are considered when writing the ICT plan
Advanced	A range of school ICT policies is developed, for example use of the internet, use of applications, health and safety issues, and management of ICT resources

Initial	An internet usage policy does not exist, as internet access is restricted to staff members
Intermediate	A basic internet use policy is developed
Advanced	An acceptable-use policy (for internet use) is developed with the involvement of parents

ICT and the curriculum

Is your school at the initial, intermediate or advanced stage for ICT and the curriculum?

Initial	Students and teachers acquire basic ICT skills
Intermediate	ICT is integrated in a number of subject areas
Advanced	ICT is integrated in project-based learning

Initial	ICT is considered a stand-alone activity
Intermediate	A range of ICT issues is commonplace (teachers' preparation and classroom management; whole-class teaching; group and individual work)
Advanced	Teachers and students use open-ended software to support curriculum activities, for example Logo, authoring, programming

Initial	Students use computers in isolation from the school curriculum
Intermediate	E-mail is incorporated in the communicative and research aspects of the curriculum
Advanced	Teachers and students use ICT to create digital content, for example project presentations, web and multimedia authoring, students' electronic portfolios

Initial	Internet use is confined mostly to e-mail and web browsing
Intermediate	The web is used as part of general class teaching
Advanced	Students use ICT to collaborate on curriculum activities, both within the school and with other schools

Initial	ICT use is experimental, and the emphasis is on applications, such as word-processing
Intermediate	ICT use reinforces existing curriculum activities
Advanced	Problem-solving and questioning learning approaches are supported by ICT

Staff development

Is your school at the initial, intermediate or advanced stage for staff development in ICT?

Initial	Some staff members have participated in basic skills training
Intermediate	All staff members have met the level of basic skills training
Advanced	Staff members are participating in third-level ICT professional development

Initial	Staff members are aware of training opportunities
Intermediate	Specialist staff members have received or are receiving appropriate skills training
Advanced	Staff members are investigating new hardware and software solutions

Initial	No contact has been made with the local ICT advisor
Intermediate	The school has contacted the local ICT advisor for support
Advanced	Staff members are actively sharing new ideas with each other and with other teachers

Initial	Staff members have not been encouraged to attend ICT courses
Intermediate	Some staff members have participated in, or are participating in, ICT courses emphasising the integration of ICT in the classroom
Advanced	Staff members are integrating relevant solutions in their teaching

Initial	Staff members are not aware of local ICT support structures
Intermediate	Members of the staff are attending relevant ICT support group meetings
Advanced	Staff members are participating in on-line ICT support groups

School ICT culture

Is your school's ICT culture at the initial, intermediate or advanced stage?

Initial	Students are guaranteed a "turn" on the computers
Intermediate	Structured ICT access is available during school time
Advanced	The school environment encourages independent ICT use by both teachers and students

Initial	Teachers have limited access to computers during school hours
Intermediate	ICT access is facilitated outside teaching time
Advanced	ICT use outside normal teaching time is encouraged

Initial	Classroom displays are supported by computer-produced labels
Intermediate	Classroom displays contain computer-produced content
Advanced	Computers are considered a school resource that students can use to support their work when applicable

Initial	The school does not have a web site
Intermediate	The school has an active and up-to-date web site with some student involvement
Advanced	The school web site is developed and maintained by teachers and students; it concentrates on students' activities and curriculum resources

Initial	The school does not engage with other schools on ICT issues
Intermediate	The school is involved in ICT projects (national or international)
Advanced	The school is seen as an exemplar of best practice by other schools

Initial	Computers are used reluctantly by teachers
Intermediate	The school is an "ICT-friendly" zone
Advanced	A positive, supportive ICT culture exists throughout the school

ICT resources and infrastructure

Are the ICT resources and infrastructure in your school at the initial, intermediate or advanced stage?

Initial	Computers are confined to a computer room
Intermediate	Computers are located throughout the school in classrooms
Advanced	A network of computers is distributed throughout the school

Initial	Computers are not networked
Intermediate	There is a peer-to-peer network within the computer room but not throughout the school
Advanced	All computers are networked; internet access is available throughout the school

Initial	There is no provision for technical support
Intermediate	Provision is made for the maintenance of computers
Advanced	A technical support contract exists

Initial	There is an internet connection through one telephone line to a computer
Intermediate	There is an internet connection via ISDN to most computers
Advanced	There is an internet connections to all computers via multiple ISDN, leased line, ADSL, or broadband cable

Initial	Limited software is available, but not enough for all classes, all subject areas, or all students with special needs
Intermediate	Some software and internet resources are available for each class or year level; multiple licences have been obtained for whole-class use
Advanced	Appropriate software and internet resources are identified and made available by age, subject, and special need

Initial	Desktop computers and printers are the only ICT equipment available in the school
Intermediate	A digital camera (or cameras) and scanner (or scanners) are used for project and web site work
Advanced	A digital projector (or projectors) and interactive whiteboard (or whiteboards) are in use throughout the school

Initial	Some computer equipment does not work and has not been repaired or replaced
Intermediate	Equipment is fixed or replaced only when absolutely necessary
Advanced	Provision is made for regular renewal of equipment



