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Directorate-General for Education and Culture

Basic Indicators on the Incorporation of ICT into European Education Systems

Facts and figures

2000/01 Annual Report

European Commission

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2000/01 Annual Report

Eurydice
The Information Network on Education in Europe

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Basic indicators (continued)

PREFACE

The need to incorporate information and communication technology (ICT) into education is now inescapable, largely as a result of the growth of the Internet. The many action plans adopted at national and European levels (*e*Learning), as well as investment in computerisation, teacher training and the updating of curricula bear witness to this. While the pace of such developments varies greatly, there is no doubt that all European countries are attaching very high priority to ICT in their national policies and seeking to adjust the way their education systems are organised and function as a result.

As part of its information activities, the Eurydice Network has been closely following the ICT issue for three years, publishing data that provide greater insight into how education systems are taking account of this new situation. Accordingly, in the 1999/2000 edition of the joint Eurydice/Eurostat report *Key Data on Education in Europe*, one chapter contained (mainly qualitative) indicators on ICT in the field of education. A Eurydice *Survey* on the subject was also published in September 2001. This provides for a better understanding of the nature and scope of national initiatives in this area.

Because the subject is so topical and the situation in different countries changing so fast, it is important to update published information on a regular basis and enhance its interest with additional fresh data. To meet this need, Eurydice will in future publish separately from *Key Data* an annual report devoted exclusively to basic indicators on ICT. It is in relation to this commitment that the present report has been prepared. It focuses mainly on the primary and secondary levels of education and comprises the 2000/01 update of the indicators in *Key Data on Education.* In the light of the changes observed in the last three years, it may be concluded that effort has been invested in this area with the very widespread incorporation of ICT into school curricula and teacher training. This report also provides more detailed information on the amount of teaching time devoted to ICT, the approaches advocated and teacher training in this area. Furthermore, it has been possible to add several indicators derived from the special Eurobarometer survey recently conducted for the European Commission in relation to *e*Learning. They offer a quantitative view of computerisation and the use to which it is put in schools.

Given that the incorporation of information and communication technology into European education systems is a process that, in the long term, will have major implications for the organisation and methods of teaching, the Eurydice Network will pursue its information activity on the issue. This contribution will continue to be of value at national level in encouraging an exchange of experience on the subject. And it will be of no less value at European level both in relation to implementation of the European *e*Learning action plan and the follow-up to the European *Report on the concrete future objectives of education and training systems*, which devotes special attention to this question.

Luce Pépin,

Head of the Eurydice European Unit

November 2001

A SHORT GUIDE TO CONTENT

This publication contains information on national policies for education in information and communication technology (ICT) and indicators on the way this technology has been incorporated into European school education systems. It has been prepared on the basis of data supplied by the National Units in the Eurydice Network (who are acknowledged at the end of the publication) and the findings of the first Eurobarometer Flash surveys on this subject. The present report demonstrates clearly how this sector has now become an educational priority. This development is unquestionably linked to the rapid growth of the Internet and the very many communication resources which are set to become part and parcel of everyone's daily life. It is also consistent with the *e*Learning action plan implemented as part of EU policy. The indicators contained in this publication draw special attention to the following aspects:

EDUCATION POLICIES ARE INCREASINGLY GEARED TO THE USE OF ICT

ICT lies at the heart of national policies. All European countries today possess official documents aiming to promote its use (Figure 1). The integration of ICT into school systems is becoming progressively more widespread. In a few cases a long-standing priority, ICT policies are increasingly being implemented. Everywhere, bodies have been set up to promote or supervise the implementation of official recommendations.

Education systems are being directly targeted by national projects drawn up in all countries (Figure 3). These initiatives relate to the whole of compulsory education and upper secondary education. Most of them are recent and began after 1995. On average, they last for five years, even though a few countries have begun projects planned to last for around ten years. The main aims are similar in nearly all countries (Figures 4 to 6), namely to boost the computerisation of schools but also the practical use of ICT in education (whether this relates to teacher training, development of the skills of pupils or the use of educational software).

BUDGETS ARE RARELY MANAGED EXCLUSIVELY AT CENTRAL GOVERNMENT LEVEL

National statistical data available regarding the purchase and maintenance of ICT equipment, or the ICT budget are hard to compare. No standardised database as yet exists. This publication does not therefore contain any information on the size of the budget allocated to ICT in the various countries. The difficulty of obtaining this sort of material is explained partly by the shared responsibilities for the purchase and maintenance of equipment. Indeed, as Figure 8 shows, in Europe it is very unusual to find financial management resting solely with the ministry in central government. Equipment budgets are most often managed either at the local level or jointly, with the responsibility shared between several levels of authority. The way budgets are allocated between equipment and human resources has also proved difficult to identify clearly in many countries. However, where the breakdown is known, equipment and facilities have often taken precedence in expenditure (Figures 9 to 11).

PROGRAMMING IS OFTEN NOT AMONG THE CURRICULAR AIMS OF THE THREE LEVELS OF SCHOOL EDUCATION

Even at primary level, learning about ICT has now become an integral part of the minimum compulsory curriculum in many countries. At secondary level, this situation is virtually the norm. In a few cases however, the inclusion of ICT is a recent development. Elsewhere, schemes to include it are under way and sometimes the focus of experimentation in a small number of schools (Figure 12). The aims pursued differ little with the level of education (Figures 16, 22 and 24). They cover a broad range of skills, extending from the use of various software packages to communication via a network, not to mention CD-ROM or network-based information searches.

Although the development of proficiency in programming is the least widely encountered objective in compulsory education (ISCED 1 and 2), it is included in the curriculum for upper secondary education in over half of all countries. The use of ICT as a tool to be used for projects or for educational content is the approach most commonly recommended for primary schools (Figure 15). Pre-accession countries typically teach it as a separate curriculum subject in its own right.

At secondary level in almost all European Union countries, ICT is taught as a separate subject, but teachers still often rely on it as a tool for teaching other subjects (Figures 20 and 23). When ICT is offered as a separate subject at the end of compulsory schooling (ISCED 2), the amount of time recommended for it in the curriculum and/or official guidelines varies enormously from under 10 hours a year to over 60 (Figure 21). To this number of hours should be added the time devoted to ICT when it is used to support projects or in other areas of educational content, but this is almost impossible to measure.

The various approaches advocated for the different levels of education are to be set in the context of teacher training. ICT specialists are most likely to be found at secondary level (Figure 25). They teach ICT as a subject in its own right, whereas teachers of other subjects make use of ICT as a tool.

A MAJORITY OF TEACHERS MAKE USE OF ICT IN THE COURSE OF THEIR TEACHING ON A REGULAR BASIS

In the European Union in 2000/01, 71 % and 60 % of teachers at primary and general secondary levels respectively (Figures 13 and 18) said they used ICT with their pupils on a fairly regular basis. Lack of access and problems of equipment or facilities are the major reasons given by teachers for not using ICT in the classroom.

Lack of any official training in the use of computers or the Internet does not appear to be a factor preventing teachers from using them with their pupils. In the EU as a whole, just over half of those teachers who had no official training use computers during their lessons (Figure 32). Similarly, in secondary education, there is no apparent relation between the use of computers or the Internet with pupils, and the age of teachers. Again taking the EU as a whole, the percentages registered for each of the four age-groups range from

57 % of teachers using computers in the highest age-group to 65 % in the youngest, and 40 % using the Internet in the highest age-group to 44 % among those aged 30-39.

AN INCREASING NUMBER OF COUNTRIES INCLUDE ICT IN THE COMPULSORY CURRICULUM OF INITIAL TEACHER TRAINING, BUT TRAINING INSTITUTIONS ARE OFTEN LARGELY FREE TO DETERMINE HOW IT SHOULD BE TAUGHT

The importance of teacher training goes hand in hand with the inclusion of ICT in the education of pupils. Indeed, only teachers who have themselves been trained in the use of ICT will be in a position to supervise their pupils effectively as they become fully familiar with and gradually master its essential resources.

In over half of all European countries, ICT has become a compulsory part of the curriculum for the initial training of teachers for either primary or secondary education (Figures 26 to 28). However, as regards the initial training of lower secondary schoolteachers for whom data is available, official recommendations on the subject of ICT training are often general and stipulate only the compulsory nature of work on ICT during initial training. In most European countries, minimum requirements concerning the amount of time to be devoted to the subject do not exist. Recommendations on content during initial training are more frequent and as much importance is generally attached to a practical command of ICT for personal use, as mastery of it for teaching purposes.

Organisation, content and the amount of time set aside for such training are, in some countries, the prerogative of individual teacher training institutions. Their total freedom in this respect raises questions as to the compatibility of ICT training for future teachers in the institutions concerned and the uniformity of the skills they acquire.

Although all countries have laid down a policy for in-service teacher training which takes account of these aspects, it appears no less urgent to ensure that all future teachers acquire the necessary skills. This is an inescapable requirement if the younger generation are to master ICT.

GLOSSARY

CODES AND ABBREVIATIONS

COUNTRY CODES

EU		European Union		**EFTA/EEA**	European Free Trade Association / European Economic Area
B		Belgium		**IS**	Iceland
	B fr	Belgium – French Community		**LI**	Liechtenstein
	B de	Belgium – German-speaking Community		**NO**	Norway
	B nl	Belgium – Flemish Community			
DK		Denmark		**Pre-accession countries**	
D		Germany		**BG**	Bulgaria
EL		Greece		**CZ**	Czech Republic
E		Spain		**EE**	Estonia
F		France		**CY**	Cyprus
IRL		Ireland		**LV**	Latvia
I		Italy		**LT**	Lithuania
L		Luxembourg		**HU**	Hungary
NL		Netherlands		**MT**	Malta
A		Austria		**PL**	Poland
P		Portugal		**RO**	Romania
FIN		Finland		**SI**	Slovenia
S		Sweden		**SK**	Slovakia
UK		United Kingdom			
	E/W	England and Wales			
	NI	Northern Ireland			
	SC	Scotland			

NATIONAL ABBREVIATIONS IN THEIR LANGUAGE OF ORIGIN

CNICE	*Centro Nacional de Información y Comunicación Educativa*	E
GCE	General Certificate of Education	UK (E/W/NI)
GCSE	General Certificate of Secondary Education	UK (E/W/NI)
HF	*Højere Forberedelseseksamen*	DK
IUFM	*Institut Universitaire de Formation des Maîtres*	F

STATISTICAL SYMBOLS AND ABBREVIATIONS

(:)	Not available
(*)	Estimate
(–)	Not applicable
ICT	Information and communication technology

THE INTERNATIONAL STANDARD CLASSIFICATION OF EDUCATION (ISCED)

In order to facilitate comparison between countries, the different levels of national education have been allocated the various ISCED levels. Beginning with data gathered for the 1997/98 academic year, the following classification is used:

ISCED 0: pre-primary education.
ISCED 1: primary education.
ISCED 2: lower secondary education.
ISCED 3: upper secondary education.
ISCED 4: post-secondary non-tertiary education.
ISCED 5: university and non-university courses in tertiary education leading to a first qualification; admission to them requires as a minimum the satisfactory completion of upper secondary education, or equivalent courses offered in post-secondary education.
ISCED 6: courses in tertiary education leading to an advanced research qualification.

According to the ISCED classification, the first two years of secondary education in Belgium and the first three years of secondary education in the United Kingdom (E/W/NI) coincide with ISCED level 2 (lower secondary education).

According to this same classification, the final three years of compulsory education offered within a single structure in Denmark, Portugal, Finland and Sweden, in the EU, are included in the same level as lower secondary education (ISCED 2). This also applies for the final three years of the single-structure system in Iceland and Norway (in the countries of the EFTA/EEA) and in Estonia. In the other pre-accession countries, in the Czech Republic and Hungary, the last four years of the single structure correspond to ISCED level 2 and in Latvia, Slovenia and Slovakia the last five years.

EUROBAROMETER INDICATORS ON THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN EDUCATION

Standard Eurobarometer surveys have been conducted for the Public Opinion Sector in the Press and Communication Directorate of the European Commission twice a year since the autumn of 1973. The same set of questions covering various matters of interest is regularly put to a representative sample of the population aged 15 and over in each EU Member State.

As part of the *e*Europe action plan, the Information Society Directorate-General, in cooperation with the Directorate-General for Education and Culture, organised two Eurobarometer Flash surveys over the telephone in 2001, covering a representative sample of school heads (Flash 101) and teachers (Flash 102) in each EU country.

The questions put to the school heads were mainly concerned with their school ICT equipment and facilities.

The questions put to the teachers mainly covered the use of computers and the Internet with their pupils (time spent using them, frequency of their use, reasons for not using them, etc.), arrangements for official provision in this field and how ICT has changed the way they taught.

The Commission has analysed the results of the Eurobarometer surveys on the use of computers and the Internet in schools throughout the EU. The document setting out these results is available at the following address:
http://europa.eu.int/information_society/eeurope/news_library/documents/index_en.htm.

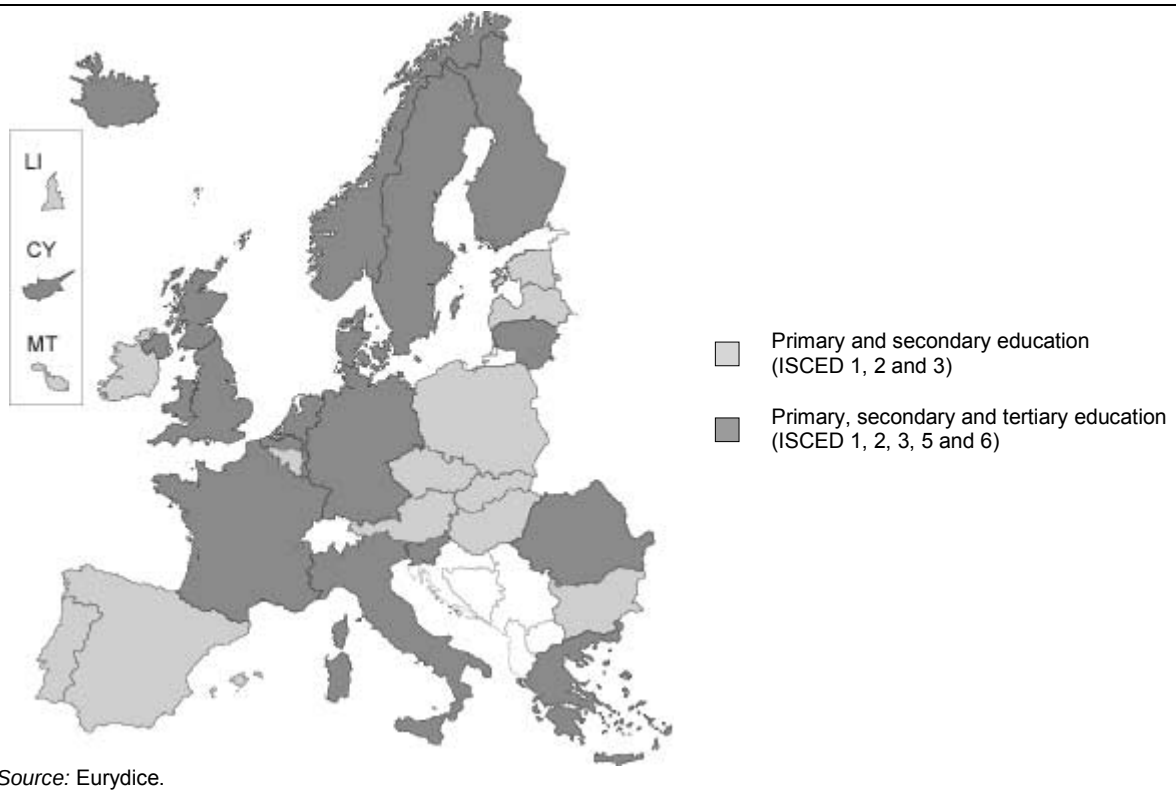
NATIONAL POLICY

NATIONAL POLICY AND OFFICIAL DOCUMENTS ON THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY

A national or official policy encouraging the use of information and communication technology in education is in operation in all European countries. This national policy has generally been encapsulated in one or more official documents (law, decree, circular, recommendation, action plan). In the majority of countries, the official documents on the use of ICT date from the 1990s. In the Czech Republic, Malta and Slovakia, they have been adopted very recently.

In all countries, these official documents cover at least compulsory (primary and secondary) education. In many countries, as illustrated in the Figure 1, they also cover tertiary education. Documents are also devoted to pre-primary education in the Flemish Community of Belgium, Spain, France, Italy, Luxembourg, Portugal, Finland, Sweden, Iceland, Malta and Slovenia.

FIGURE 1: EDUCATION LEVELS COVERED BY OFFICIAL DOCUMENTS ON THE USE OF ICT. PRIMARY, SECONDARY AND TERTIARY EDUCATION (ISCED 1-3, 5 AND 6) (IN FORCE DURING 2000/01).



Source: Eurydice.

Additional notes

Netherlands: In tertiary education, only teacher-training institutes are involved in the national programme launched in 1997.
United Kingdom: The National Grid for Learning aims to support learners in all sectors of education. However, the initial focus has been on primary schools and teacher education.
Czech Republic: In April 2000, the government approved a document based around two priorities: promoting an infrastructure for ICT in education and facilitating their incorporation into curricula at all levels of education. This document is completed by an implementation-plan for the period 2001-2005.
Latvia: There is no official document relating to tertiary education, but curricula include various courses in ICT.
Malta: The national minimum curriculum published in December 1999 encourages the use of ICT in primary and secondary education.
Slovakia: The *Infovek* project adopted in 1998 officially recognises the use of ICT in primary and secondary education.

Explanatory note

For details on the coverage of ISCED 2, see the glossary at the beginning of the booklet.

NATIONAL OR OFFICIAL BODIES ARE RESPONSIBLE FOR SUPERVISING AND/OR PROMOTING NATIONAL POLICY

In all European countries, one or more national or public bodies are responsible for ensuring compliance with the requirements of official documents, promoting practical measures and centralising initiatives.

The number of such bodies varies from country to country, but their duties and responsibilities normally include some or all of the following: they define the objectives to be pursued; they select and/or supply the hardware and the software; they organise teacher training and the development of new software; they monitor and coordinate the various initiatives implemented in this area; they are responsible for the application of the decisions taken and the agreements concluded; and they collect information to assess the impact of the projects and programmes set in place, etc.

FIGURE 2: NATIONAL OR OFFICIAL BODIES WITH A REMIT FOR SUPERVISION AND/OR PROMOTION OF NATIONAL POLICY FOR ICT IN EDUCATION, 2000/01

B fr	Ministry of the French Community, and the Regions of Wallonia and Brussels-Capital Region
B de	Ministry: Organisation of the Unterrichtswesens
B nl	Departement Onderwijs (Department of Education) Afdeling Beleidscoördinatie (Policy Co-ordination Division)
DK	Undervisningsministeriet UNI*C Learning Lab Denmark
D	Kultusministerien / Wissenschaftsministerien *(Länder)* Bundesministerium für Bildung und Forschung *(Bund)*
EL	Armodies Ypiresies YPEPTH Pedagogiko Instituto Erevnitiko Akademaiko Instituto Technologias Ypologiston (EAITY) Tmimata Anotaton Ekpaideftikon Idrymaton Instituto Epexergasias Logou Diefthinseis Protovathmias kai Defterovathmias Ekpaidefsis Nomon Periferiaka Epimorfotika Kentra
E	Centro Nacional de Información y Comunicación Educativa (Ministerio de Educación, Cultura y Deporte) Programa de Nuevas Tecnologías de la Educación de Canarias Xarxa Telemática Educativa de Catalunya Centro Multimedia de Galicia Red telematica Educativa de Andalucia, etc.
F	Ministère de l'éducation nationale Rectorats Ministère de la recherche (Direction de la technologie)
IRL	Department of Education and Science – National Centre for Technology in Education National Council for Curriculum Assessment (NCCA)
I	Ministero della Pubblica Istruzione Ministero dell'Università e della Ricerca Scientifica e Tecnologica
L	Centre de technologie de l'éducation – CTE (Ministère de l'éducation nationale, de la formation professionnelle et des sports) Service de Coordination de la Recherche et de l'Innovation pédagogiques et technologiques – SCRIPT (Ministère de l'éducation nationale, de la formation professionnelle et des sports)
NL	Ministerie van Onderwijs, Cultuur en Wetenschappen (ICT department for policy development, co-ordination and funding) Kennisnet (organisation of the educational portal site and network) Surfnet (organisation of the educational network for higher education) ICT Foundation for schools (maintenance, cooperation between schools and local authorities, commercial development of the educational use of ICT and innovation in its use) Expertise Centre (support for the development of educational multimedia projects) Pedagogical Centre (support for schools) Dutch education inspectorate (management and development of ICT policy)
A	Bundesministerium für Bildung, Wissenchaft und kulturelle Angelegenheiten Landesschulräte Bezirksschulräte Schulleiter
P	Programme Nonio – Seculo XXI, ICT Programme for Schools (Ministry of Education) Coordination Group for programmes to introduce and extend ICT and provide training in this field at the Ministry of Education Internet na Escola, Programme for School Computer Networks (Ministry of Science and Technology) Operational Programme for the Information Society (Ministry of Science and Technology)
FIN	Opetusministeriö – Undervisningsminsteriet (Ministry of Education) Opetushallitus – Utbildningsstyrelsen (National Board of Education)
S	Statens skolverk (National Agency for Education) ITiS (the ICT school delegation)

Source: Eurydice.

Additional notes

Spain: The names of the official bodies listed may vary from one Autonomous Community to the next.

FIGURE 2 (CONTINUED): NATIONAL OR OFFICIAL BODIES WITH A REMIT FOR SUPERVISION AND/OR PROMOTION OF NATIONAL POLICY ICT IN EDUCATION, 2000/01

UK E/W/NI	British Educational Communications and Technology Agency – Becta Local Education Authorities (E/W) Education Technology Strategic Management Group (NI) Education and Library Boards (NI) New Opportunities Fund Teacher Training Agency – TTA (E) Department for Education and Skills (England) National Assembly for Wales Education Department (Wales) Department of Education (Northern Ireland) Joint Information Systems Committee
UK SC	Learning and Teaching Scotland Joint Information Systems Committee Scottish Executive Education Department New Opportunities Fund
IS	Menntamálaráðuneytið (Ministry of Education, Science and Culture)
LI	Schulamt Arbeitsgruppen P, Sek I und Sek II
NO	Kirke-, utdannings- og forskningsdepartementet Læringssenteret Forsknings- og kompetansenettverk for IT I utdanningen Statens utdanningskontor
BG	Министерство на образованието и науката (Ministry of education and Science)
CZ	Ministerstvo školství, mládeže a tělovýchovy (Ministry of Education, Youth and Sports) Rada pro realizaci státní informační politiky ve vzděláváni (Council for the Implementation of the Information Policy for Education) Koordinacni centrum (Coordination Centre of the Ministry of Education)
EE	Haridusministeerium (Ministry of Education) Tiigrihüppe Sihtasutus (Tiger Leap Foundation) PHARE 'Infosüsteemid hariduses' Programme (Information Systems in PHARE Education – ISE Programme) EENet (Estonian Network for Education and Research)
CY	Ypourgeio Paideias kai Politismou
LV	Izglītības un zinātnes ministrija Latvijas Universitāte LIIS Uzraudzības padome (Latvian Education Computerisation System Surveillance Board)
LT	Švietimo ir Mokslo Ministerija Švietimo informaciniu technologiju centras
HU	Oktatási Minisztérium (Ministry of Education) Sulinet Iroda (Hungarian Programme for School Computer Networks) Megyei Pedagógiai Intézetek (Regional Pedagogical Institute)
MT	The National Curriculum Council (NCC) ICT Branch of the Department of Curriculum Management (Ministry of Education) Sub-Committee of the e-Government Committee
PL	Ministerstwo Edukacji Narodowej (Ministry of National Education)
RO	Consiliul pentru Informatizarea Educației Naționale (ICT Council of the Ministry of Education) Comisia Națională pentru Informatică (National Commission for ICT) Consiliul pentru Coordonarea RoEduNet (Council for Coordination of the Romanian Education Network)
SI	Programski svet za računalniško opismenjevanje (SI/RO Programme Council) Ministrstvo za šolstvo, znanost in šport (Ministry of Education and Sport) Zavod Republike Slovenije za šolstvo (National Education Institute) Center Republike Slovenije za poklicno izobraževanje (Centre for Vocational Education and Training)
SK	Ministerstvo školstva SR, Metodické centrá

Source: Eurydice.

NATIONAL PROJECTS FOR THE INTRODUCTION OF TECHNOLOGY ARE ON THE INCREASE

One or more projects aimed at introducing ICT into secondary education have been initiated in all European countries. With the exception of very few education systems (the German-speaking Community of Belgium and Latvia), projects also exist at primary level. These projects are national or regional (in the case of countries in which responsibilities for policy has been decentralised).

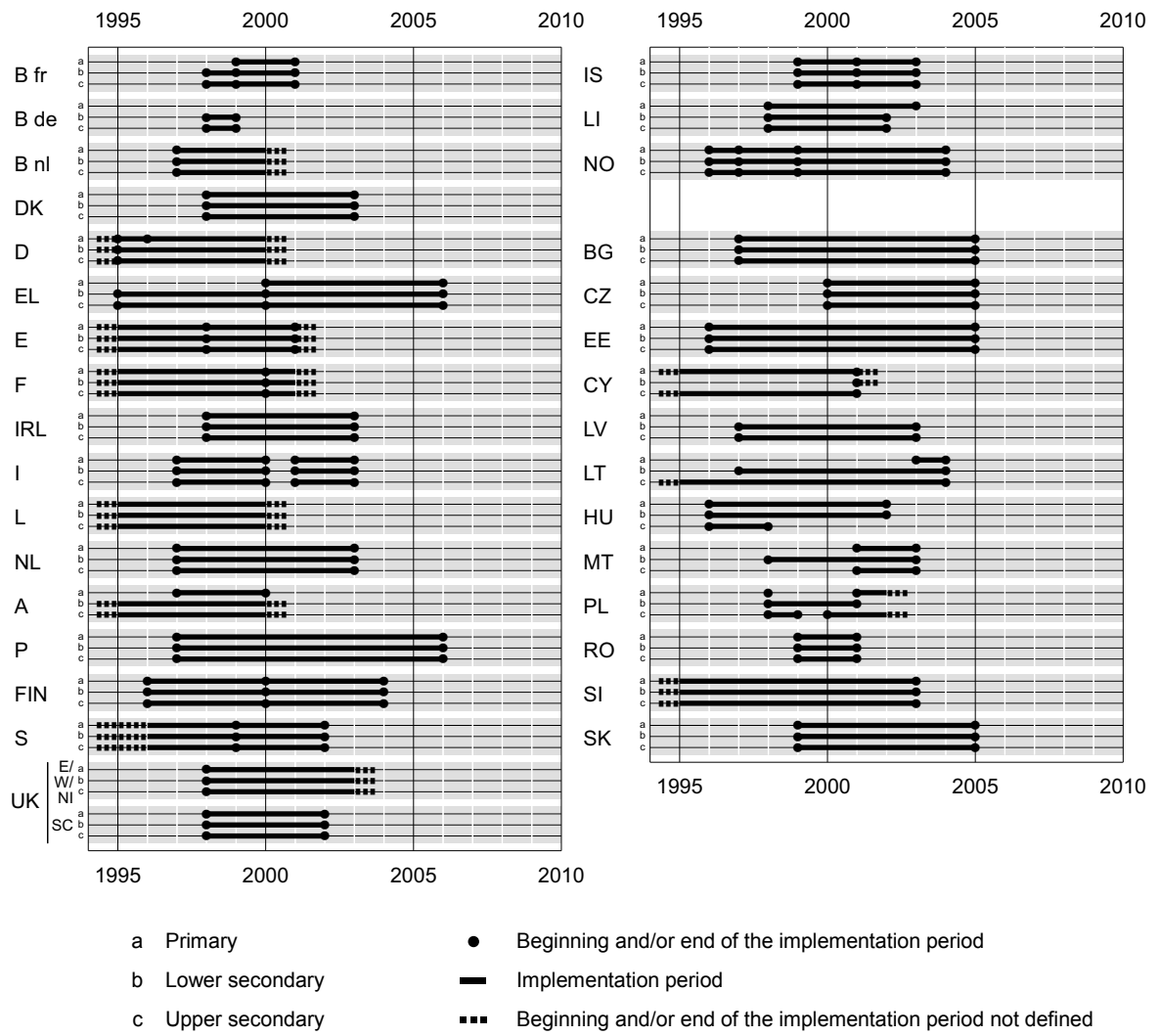
In Spain, plans are being developed through the *Centro Nacional de Información y Comunicación Educativa* (CNICE), directly run by the ministry, and the different Autonomous Communities, covering three levels of education (primary, lower secondary, upper secondary).

These national or regional plans go hand in hand with local initiatives. They are particularly numerous in Finland and Sweden.

SCHEDULES FOR PROJECT IMPLEMENTATION ARE OFTEN SHORT OR MEDIUM-TERM

Most projects at primary and secondary levels of education generally started after 1995. The most long-standing initiatives were launched in the 1980s, and only rarely involved the three levels of education (except in Spain and France).

FIGURE 3: IMPLEMENTATION SCHEDULE FOR TYPICAL ICT PROJECTS. PRIMARY AND SECONDARY EDUCATION (ISCED 1, 2, 3), 1995-2010



Source: Eurydice.

Additional notes

United Kingdom (E/W/NI): Programmes, strategies, and funding mechanisms differ between England, Wales and Northern Ireland. Funding programmes for England and Wales have now been extended to 2004.
Bulgaria: A new national policy for the use of ICT in education was developed and adopted in 1998. An implementation programme has been drawn up with special attention being given to funding.

On average, the majority of projects last five years. Several initiatives have been launched between 1999 and 2001. In 1999, a project got under way for the three levels of education in Iceland, Romania and Slovakia. In 2000, Greece, the Czech Republic and Poland, in upper secondary education, took up a new or initial project. Projects got under way in 2001 in Italy, Iceland and, at primary and upper secondary levels, in Malta. Most of these initiatives are either short term (up to three years), or for an indefinite period and are granted a new budget every year (Spain and France). However, some countries have undertaken long-term projects lasting up to nine years (Portugal and Estonia). Plans for most projects extend up to 2003/04. Only the initiatives in Greece and Portugal are programmed up to 2006.

EQUIPMENT AND FACILITIES, TRAINING AND USE OF THE INTERNET: THREE MAIN AIMS OF NATIONAL PROJECTS

Objectives have been set in all existing projects. Six categories have been defined here. The objectives relate to equipment; the acquisition and construction of software; the skills of teachers and pupils and the use of the Internet.

In most countries, and throughout the three levels of education, the stated objectives cover the six categories. However certain countries have not set objectives for the acquisition, distribution and development of software.

Virtually all countries aim to enhance the equipment and facilities of their schools (in terms of provision per pupil, renewal and ease of access). In addition, they attach priority to the practical use of ICT in education (as reflected in teacher training, development of the skills of pupils and the use of educational software).

However, in compulsory and general upper secondary education in Denmark, the projects have concentrated on developing teachers' skills and on fostering the use of the Internet in general, through the creation of a common Internet service provider, the *Sektornet*, for all schools to promote further the development of pupils' skills. In the Netherlands, a national education network, the *Kennisnet*, in which schools, libraries and museums are linked together, was created in 1999.

In Austria (the *Hauptschulen*) and Bulgaria, the plan worked out for lower secondary education centres on developing the skills of teachers and pupils.

Several countries' projects also include objectives other than those cited in the above categories. They cover aspects such as the administration of the education system, monitoring the education system and/or innovations to it, and training all citizens in the use of the new technologies, etc.

FIGURE 4: OBJECTIVES IN ICT.
PRIMARY EDUCATION (ISCED 1). PROJECTS UNDER WAY IN 2000/01

	B fr	B de	B nl	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
Equipment (availability, renewal, accessibility, etc.)	●	(–)	●		●	●	●	●	●	●	●	●		●	●	●	●
Acquisition and/or distribution of software		(–)	●		●	●	●	●	●	●	●	●		●		●	●
Development of teachers' skills	●	(–)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Development of pupils' skills	●	(–)	●		●	●	●	●	●	●	●	●	●	●	●	●	●
Help in the development of software/educational software		(–)			●	●	●	●	●	●		●		●	●	●	●
Use of the Internet	●	(–)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

	IS	LI	NO	BG	CZ	EE	CY	LV	LT	HU	MT	PL	RO	SI	SK
Equipment (availability, renewal, accessibility, etc.)	●	●	●	●	●	●	●	●	(–)	●	●	(–)	●	●	●
Acquisition and/or distribution of software	●	●	●	●	●	●	●	●	(–)	●	●	(–)	●	●	●
Development of teachers' skills	●	●	●	●	●	●	●	●	(–)	●	●	(–)	●	●	●
Development of pupils' skills	●	●	●	●	●	●	●	●	(–)	●	●	(–)	●	●	●
Help in the development of software/educational software	●		●	●		●		●	(–)	●	●	(–)		●	●
Use of the Internet	●	●	●	●	●	●	●	●	(–)	●	●	(–)	●	●	●

Source: Eurydice.

(–): There is no national project on the use of ICT at this level of education.

Additional notes

Netherlands: The policy of the Dutch government is geared to complete development of the use of ICT for teaching purposes in every educational sector. The way schools achieve that goal is their own responsibility, while the government provides the funding and supports them.

Norway: A national initiative has been launched, in order to offer all teachers in-service training and further education so that they can use ICT as a pedagogical tool.

FIGURE 5: OBJECTIVES IN ICT. SECONDARY EDUCATION (ISCED 2 AND 3). PROJECTS UNDER WAY IN 2000/01

	B fr	B de	B nl	DK	D	EL	E	F	IRL	I	L	NL	A (a)	A (b)	P	FIN	S	UK
Equipment (availability, renewal, accessibility, etc.)	●	●	●		●	●	●	●	●	●	●	●		●	●	●	●	●
Acquisition and/or distribution of software		●	●		●	●	●	●	●	●	●	●		●	●		●	●
Development of teachers' skills	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Development of pupils' skills	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
Help in the development of software/educational software		●			●	●	●	●	●	●		●			●	●	●	●
Use of the Internet	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

	IS	LI	NO	BG	CZ	EE	CY	LV	LT	HU	MT	PL	RO	SI	SK
Equipment (availability, renewal, accessibility, etc.)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Acquisition and/or distribution of software	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Development of teachers' skills	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Development of pupils' skills	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Help in the development of software/educational software	●		●	●	●	●	●	●	●	●				●	●
Use of the Internet	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Source: Eurydice.

Additional notes

Netherlands: The policy of the Dutch government is geared to complete development of the use of ICT for teaching purposes in every educational sector. The way schools achieve that goal is their own responsibility, while the government provides the funding and supports them.
Austria: (a) *Hauptschulen* (ISCED 2), (b) *Allgemeinbildende höhere Schulen* (ISCED 2 and 3).
Norway: A national initiative has been launched, in order to offer all teachers in-service training and further education so that they can use ICT as a pedagogical tool.
Czech Republic: Support for the development of educational or other software is available at upper secondary level only.

THE NUMBER OF PUPILS PER COMPUTER IS HIGHER WHEN COMPUTERS ARE CONNECTED TO THE INTERNET

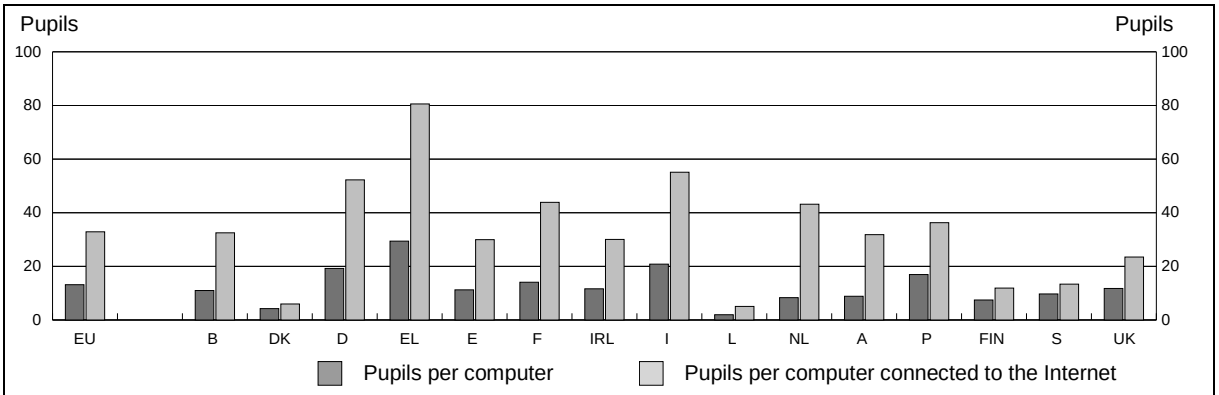
The great majority of primary and secondary schools in EU countries now have computer facilities. Some computers are used for administrative and/or management purposes, others for educational purposes. Only the latter are considered in Figures 6 and 7. However, when school heads indicate the number of computers in their school which are used for educational purposes, they do not state whether this means that teachers use them to prepare their lessons or actually with their pupils in the classroom.

One point is clear: irrespective of the level of education concerned, fewer pupils per computer are reported in responses that include no indication as to the existence or otherwise of Internet connections. Conversely, when only computers connected to the Internet are taken into account, the number of pupils per computer rises significantly in many countries, and doubles on average.

At primary level, this Internet-link-related increase in the number of pupils per computer is most marked in the Netherlands and Austria. By contrast, in Denmark, Finland and Sweden, the corresponding increase is modest.

Countries in which primary schools are especially well equipped with computer facilities, whether in terms of computers themselves or Internet connections, are Denmark, Luxembourg and Finland. However, in Germany, Greece and Italy, the number of pupils per computer, with or without an Internet connection, is well above the European average: it varies from between 20-30 pupils per computer as a whole and 50-80 pupils per computer when there is an Internet connection.

FIGURE 6: NUMBER OF PUPILS PER COMPUTER, AND NUMBER OF PUPILS PER COMPUTER WITH AN INTERNET CONNECTION. PRIMARY EDUCATION (ISCED 1), 2001



	EU	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
	13.2	11.0	4.2	19.2	29.4	11.2	14.1	11.6	20.8	2.0	8.3	8.9	17.0	7.5	9.7	11.8
	32.9	32.5	6.0	52.3	80.6	30.0	43.9	30.1	55.1	5.1	43.2	31.8	36.3	11.9	13.4	23.5

Source: Eurobarometer Flash 101.

Explanatory note

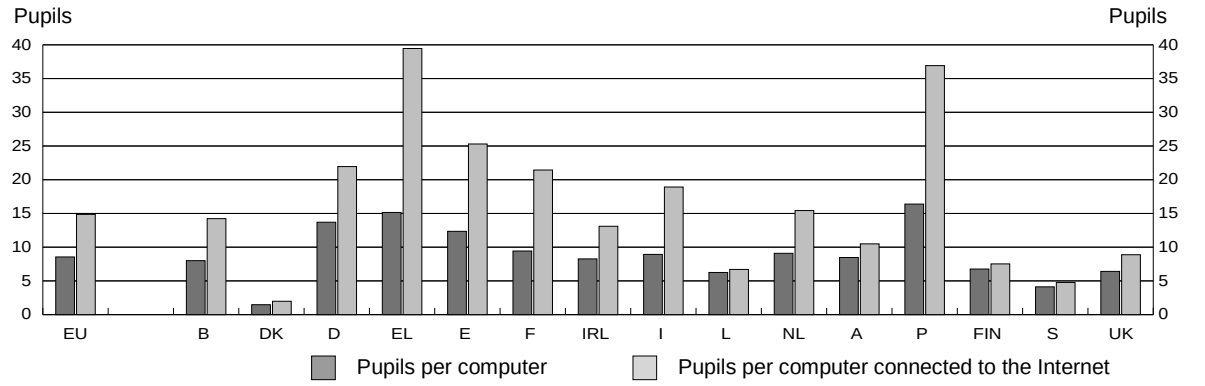
In calculating the number of pupils per computer, only schools where computers are used for educational purposes are taken into account.

THE NUMBER OF PUPILS PER COMPUTER IS LOWER IN SECONDARY EDUCATION

Secondary schools are better equipped with computer facilities overall. The number of pupils per computer (with or without an Internet connection) is nearly always lower than in primary education. Pupil/computer ratios are especially low in Denmark and Sweden; by contrast, they are well above the European average in Greece, Spain and Portugal.

Differences between the ratios that are dependent on the existence (or otherwise) of Internet connections are less marked than in primary education. When computers are used for educational purposes, they are often connected to the Internet. This applies especially to Luxembourg, Finland and Sweden, and to a lesser extent in Denmark, Austria and the United Kingdom.

FIGURE 7: NUMBER OF PUPILS PER COMPUTER, AND NUMBER OF PUPILS PER COMPUTER WITH AN INTERNET CONNECTION, IN SECONDARY EDUCATION (ISCED 2 AND 3), 2001



	EU	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
Pupils per computer	8.6	8.0	1.5	13.7	15.2	12.4	9.4	8.3	8.9	6.3	9.1	8.5	16.4	6.8	4.1	6.4
Pupils per computer connected to the Internet	14.9	14.2	2.0	22.0	39.5	25.3	21.4	13.1	18.9	6.7	15.4	10.5	36.9	7.5	4.8	8.9

Source: Eurobarometer Flash 101.

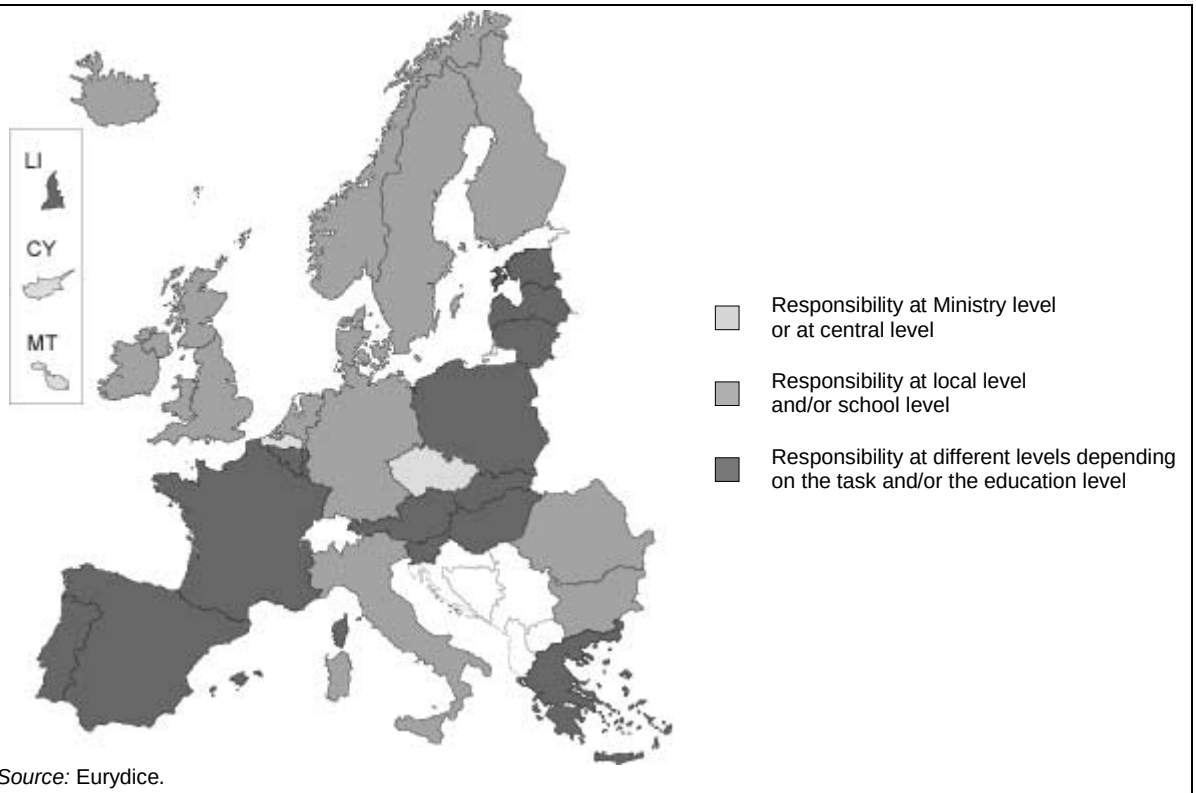
Explanatory note

In calculating the number of pupils per computer, only schools where computers are used for educational purposes are taken into account.

SHARED RESPONSIBILITY FOR THE PURCHASE AND MAINTENANCE OF HARDWARE

The central authorities are rarely solely responsible for the purchase and maintenance of hardware (except in the Flemish Community of Belgium, Cyprus and Malta for all levels of education and in Austria, in the case of secondary education). In most European countries, these responsibilities are either assumed solely at local level and/or by the school, or they are shared by different authorities, depending on the level of education (Luxembourg and Poland) or type of expenditure concerned (purchase of hardware or software, or equipment maintenance). The latter situation is the one most frequently encountered.

FIGURE 8: RESPONSIBILITY FOR THE PURCHASE AND MAINTENANCE OF HARDWARE. PRIMARY AND SECONDARY EDUCATION (ISCED 1, 2, 3). PROJECTS UNDER WAY IN 2000/01



Source: Eurydice.

Additional notes

Belgium (B de): The situation shown relates to secondary education. There is no ongoing project in primary education.
Belgium (B nl): The ministry defines the framework (PC/KD 1998-2002) and provides the additional finance available for infrastructure. The schools decide how to allocate the money between the purchase of hardware and software and in-service training.
Luxembourg: In the case of primary education, the municipalities are responsible for the purchase of computer equipment and facilities and their maintenance. As far as secondary education is concerned, the Ministry of Education is entirely responsible for these tasks, with the support of a specialised department, the Centre for Educational Technology (CTE). This Centre also offers some support at primary level.
Austria: In primary education, responsibility for purchasing and maintenance is assumed by different levels of authority; in lower secondary education, this is the local level; in upper secondary education, the ministry is responsible for school equipment and facilities.
United Kingdom (E/W/NI): Schools and local authorities are supported by special government grants for expenditure on ICT infrastructure, services and content.
Czech Republic: The situation shown relates to secondary education; there is no ongoing project in primary education.
Cyprus: The situation shown relates to primary and upper secondary education; there is no ongoing project in lower secondary education.
Poland: In primary education, responsibility for purchasing and maintenance is assumed at local level; in secondary education, different levels of authority share it.
Slovakia: Since 1998, the Ministry of Education has been responsible (under the *Infovek* project) for the purchase and maintenance of computer hardware and software (in primary and secondary education). Municipalities and schools remain jointly responsible for determining how its allocations should be distributed.

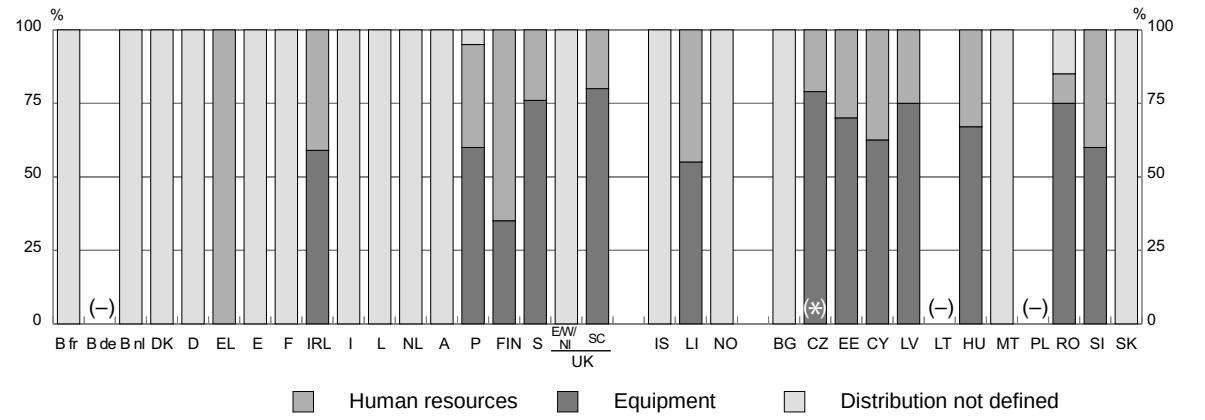
EXPENDITURE ON EQUIPMENT OFTEN PREDOMINATES IN SPECIFIC BUDGETS

A special budget is set aside to carry out projects in all the countries concerned.

It is not always possible to ascertain the distribution among the various headings. For example, in Spain, the CNICE does not allocate a budget for human resources because the staff and the teachers specialising in ICT are civil servants and their pay comes out of a different budget. In France, teacher training and human resources are the responsibility of the State whereas equipment is the responsibility of the local authorities. In Italy, the distribution is different as it depends on the projects undertaken by the schools. In Luxembourg, at primary level, the equipment budget is the responsibility of the municipality. In Austria, at primary level, there is no national budget; the *Länder* and municipalities may or may not provide a budget.

Where it is possible to ascertain how the budget is distributed among the various headings, it can be seen that expenditure on equipment and facilities accounts for the larger share and that its relative size in the budget increases still further at secondary level. Greece and Finland are exceptions in that, respectively, 100 and 65 % of their budgets are earmarked for human resources. At upper secondary level, priorities are the opposite in Greece in which 20 % of the budget is for equipment and facilities. In Luxembourg and Lithuania, throughout secondary level, and in Bulgaria at upper secondary level, almost the entire budget (90-95 %) is devoted to equipment.

FIGURE 9: DISTRIBUTION OF THE SPECIFIC BUDGET BETWEEN THE PURCHASE OF EQUIPMENT AND EXPENDITURE ON HUMAN RESOURCES. PRIMARY EDUCATION (ISCED 1). PROJECTS UNDER WAY IN 2000/01



	B fr	B de	B nl	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK E/W/NI	UK SC	IS	LI	NO	BG	CZ	EE	CY	LV	LT	HU	MT	PL	RO	SI	SK
Human resources		(–)				100			41					35	65	24		20		45			21*	30	37.5	25	(–)	33		(–)	10	40	
Equipment		(–)							59					60	35	76		80		55			79*	70	62.5	75	(–)	67		(–)	75	60	
Distribution not defined	100	(–)	100	100	100		100	100		100	100	100	100	5			100		100		100	100					(–)		100	(–)	15		100

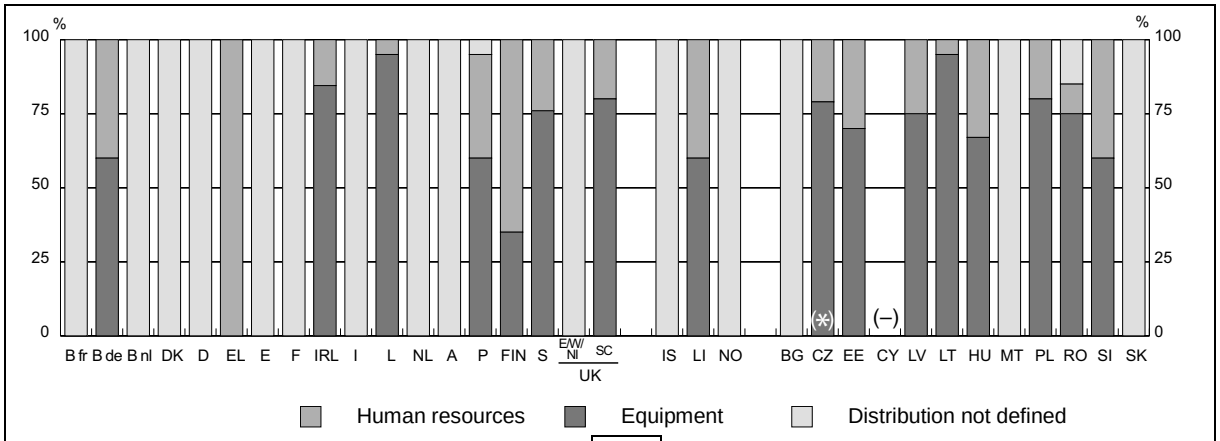
Source: Eurydice.

(–): There is no national project on the use of ICT at this level of education.

Additional notes

Finland: Expenditure on human resources also includes the development costs of new learning environments, teaching methods and materials.
Norway: In general, central government funding covers expenditure on human resources and not equipment but, to develop the *Schoolnet*, expenditure on equipment has also been covered.
Bulgaria: During the 2000/01 school year, expenditure covered only 10 % of primary schools.

FIGURE 10: DISTRIBUTION OF THE SPECIFIC BUDGET BETWEEN THE PURCHASE OF EQUIPMENT AND EXPENDITURE ON HUMAN RESOURCES. GENERAL LOWER SECONDARY EDUCATION (ISCED 2). PROJECTS UNDER WAY IN 2000/01



	B fr	B de	B nl	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK E/W/NI	UK SC	IS	LI	NO	BG	CZ	EE	CY	LV	LT	HU	MT	PL	RO	SI	SK
		40				100			15.5		5			35	65	24		20		40			21*	30	(–)	25	5	33		20	10	40	
		60							84.5		95			60	35	76		80		60			79*	70	(–)	75	95	67		80	75	60	
	100		100	100	100		100	100		100		100	100	5			100		100		100	100			(–)				100		15		100

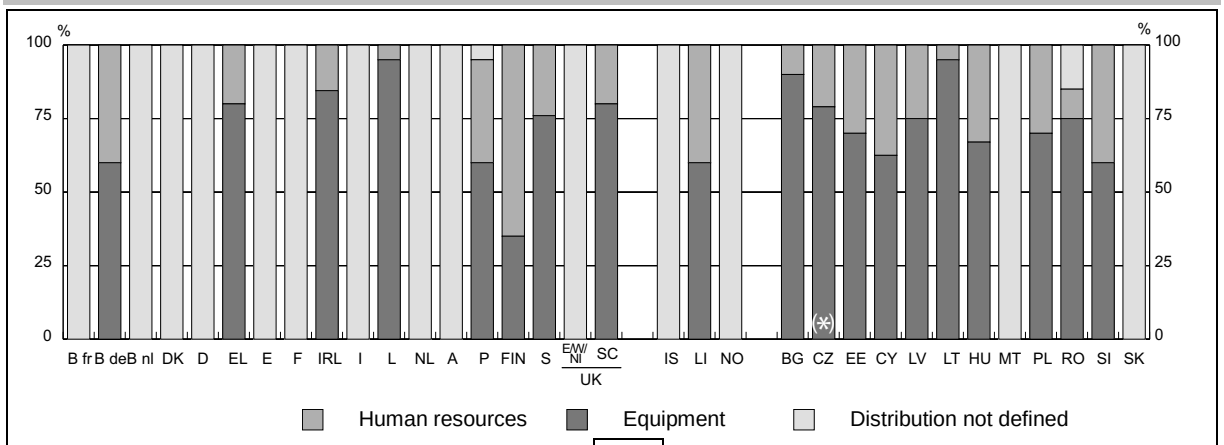
Source: Eurydice.

(–): There is no national project on the use of ICT at this level of education.

Additional note

Finland: Expenditure on human resources also includes the development costs of new learning environments, teaching methods and materials.
Norway: In general, central government funding covers expenditure on human resources and not equipment but, to develop the *Schoolnet*, expenditure on equipment has also been covered.
Cyprus: A national project has been introduced at this level from the school year 2001/02.

FIGURE 11: DISTRIBUTION OF THE SPECIFIC BUDGET BETWEEN THE PURCHASE OF EQUIPMENT AND EXPENDITURE ON HUMAN RESOURCES. GENERAL UPPER SECONDARY EDUCATION (ISCED 3). PROJECTS UNDER WAY IN 2000/01



	B fr	B de	B nl	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK E/W/NI	UK SC	IS	LI	NO	BG	CZ	EE	CY	LV	LT	HU	MT	PL	RO	SI	SK
		40				20			15.5		5			35	65	24		20		40		10	21*	30	37.5	25	5	33		30	10	40	
		60				80			84.5		95			60	35	76		80		60		90	79*	70	62.5	75	95	67		70	75	60	
	100		100	100	100		100	100		100		100	100	5			100		100		100								100		15		100

Source: Eurydice.

Additional note

Finland: Expenditure on human resources includes the cost of the development of teaching methods and environments.
Norway: In general, central government funding covers expenditure on human resources and not equipment but, to develop the *Schoolnet*, expenditure on equipment has also been covered.

ICT IS PART OF THE PRIMARY SCHOOL CURRICULUM

In primary education, ICT is included in the curriculum in many European countries. Depending on the country concerned, its inclusion is more or less recent.

FIGURE 12: INCLUSION OF ICT IN THE CURRICULUM.
PRIMARY EDUCATION (ISCED 1), 2000/01

Source: Eurydice.

Additional notes

Belgium (B fr): Since 1999, ICT has been planned for inclusion among the 'core skills' in education, in which the competence that pupils should acquire in the subject is clearly specified. The inclusion of ICT in courses is compulsory with effect from 2001.
Germany: The *Kultusministerkonferenz* and the legislation of the different *Länder* make recommendations on the use and the role of ICT in school life.
Greece: ICT is not part of the curriculum but the Pedagogical Institute has encouraged its use in a pilot project involving 40 primary schools (*To Nisi ton Phaekon* programme).
Ireland: ICT became part of the primary education curriculum in 1999.
Italy: There are no recommendations on the use of ICT in the curriculum, but one of the aims of the *Piano d'azione per la Società dell'informazione*, which is planning to supplement, strengthen and provide further funding for the *Programma di Sviluppo delle Tecnologie Didattiche* in 2001-2003, is that ICT should be used to improve the effectiveness of teaching/learning and the way it is organised in each subject, as well as for the acquisition of general skills.
Luxembourg: ICT is a central aspect of innovation projects.
Netherlands: Since 1998/99, ICT has been one of the horizontal skills targeted by the primary school curriculum which does not, however, specify the number of hours to be devoted to it.
Austria: The 1999 *Lehrplan der Grundschule* brought ICT into primary education.
Portugal: ICT has been part of the curriculum in primary education since the adoption of the statutory order of 18 January 2001. It will be one of the horizontal skills targeted by primary education with effect from 2001/02.
Iceland: ICT has been part of the curriculum since 1999/2000.
Bulgaria: ICT is included in the curriculum as an elective subject, and schools themselves decide whether they will teach it.
Czech Republic: A debate on national education programmes was launched in 2000, covering among other things the place of ICT. Discussions on this latter point are still continuing.
Cyprus: ICT has been subject to experimentation since 1993, and introduced into 69 schools since September 2001. Activities, educational material and ideas for the implementation of ICT in the curriculum are being forwarded to the schools involved.
Lithuania: ICT is an extra-curricular subject (taught after class hours).
Malta: Although included by the Ministry of Education in a scheme for primary education in 1995, ICT has officially been part of the curriculum since the publication of the National Minimum Curriculum in December 1999.

Explanatory note

By curriculum is meant any official recommendation regarding the subjects taught, whether as compulsory subjects or those involving an element of choice on the part of pupils.

In Ireland, the Netherlands, Austria, Portugal and Iceland, ICT has become a part of the curriculum recently. Elsewhere, plans for its introduction are ongoing and sometimes the focus of experimentation in a limited number of schools (Greece, Luxembourg and Cyprus). In the United Kingdom, ICT has been part of the curriculum in England and Wales since the National Curriculum was first introduced in 1988. In Northern Ireland, it has been a requirement (as an educational theme woven through the main subjects) since the Northern Ireland Curriculum was implemented following legislation passed in 1989. The curriculum in the Netherlands and in the United Kingdom does not specify the **number of hours** to be devoted to this compulsory subject as the schools are free to decide on the allocation of hours of teaching. In Poland, 19 hours a year are allocated to the subject.

ICT is offered as an option in some countries, in some cases only recently (Liechtenstein, Bulgaria and Romania). In the case of an elective course, the number of hours to be devoted to it is seldom specified in the curriculum. It depends sometimes on the school, as is the case in Estonia and Hungary. Where a certain number of hours is specified, it varies: 26 hours a year in Slovenia, 28 hours in Romania and 40 hours in Liechtenstein.

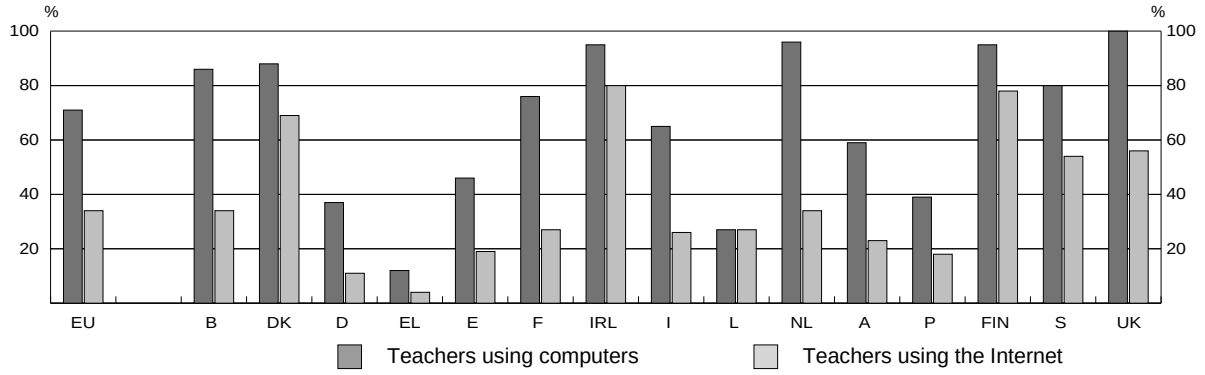
Pupils' results in this subject are taken into account for **progression** to the next year in certain countries: Estonia, Poland and Romania. A **certificate** is awarded on the basis of the knowledge and skills acquired in this subject at the end of primary school in Liechtenstein.

A MAJORITY OF PRIMARY SCHOOLTEACHERS REGULARLY USE COMPUTERS WITH THEIR PUPILS DURING LESSONS

As Figure 12 shows, ICT is a part of the primary school curriculum in most EU countries. Its inclusion in curricula is borne out in the way teachers work given that, in the EU as a whole, a great many of them state that they use computers during lessons with their pupils. The percentages reported are especially high in Denmark, Finland, Sweden and the United Kingdom, as well as in three countries (Belgium, Ireland and the Netherlands), in which the inclusion of ICT in primary school curricula has only become compulsory quite recently. By contrast, in other countries, the percentages of teachers using computers with their pupils are relatively low. The countries concerned are mainly ones that have not yet included ICT in their curriculum (Greece and Luxembourg).

While many teachers use computers with their pupils, fewer do so in order to consult the Internet. In terms of the average EU figures, only around half as many do so. The percentages of teachers who consult the Internet with their pupils and of those who use computers for general teaching in the classroom are closest in Denmark, Ireland, Luxembourg and Finland. Conversely, in Germany, Greece, France and the Netherlands, the foregoing differences are very marked: only one-third of teachers who use computers in the classroom also do so in order to consult the Internet.

FIGURE 13: PERCENTAGE OF TEACHERS WHO USE COMPUTERS AND/OR THE INTERNET IN THE CLASSROOM. PRIMARY EDUCATION (ISCED 1), 2001



%	EU	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
	71	86	88	37	12	46	76	95	65	27	96	59	39	95	80	100
	34	34	69	11	4	19	27	80	26	27	34	23	18	78	54	56

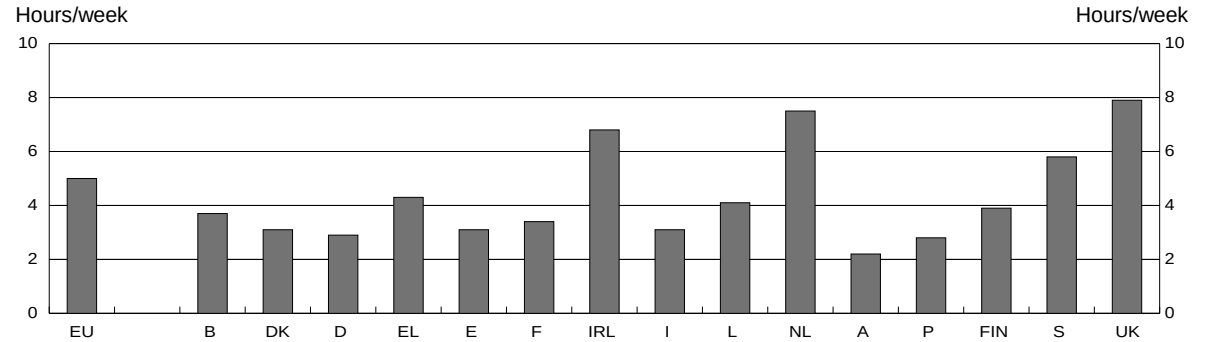
Source: Eurobarometer Flash 102.

Explanatory note

Teachers of computer science are included in the figures used to calculate these percentages.

When primary schoolteachers within the EU use computers with their pupils, they do so on average for five hours a week. This average belies some quite marked contrasts. The average period of use is especially high in Ireland (almost 7 hours a week), the Netherlands (7½ hours) and in the United Kingdom (almost 8 hours). Conversely, average periods of use are shortest (less than three hours a week) in Germany, Austria and Portugal.

FIGURE 14: AVERAGE PERIODS DURING WHICH PRIMARY SCHOOLTEACHERS (ISCED 1) USE COMPUTERS (WITH OR WITHOUT INTERNET CONNECTIONS) IN THE CLASSROOM, IN HOURS PER WEEK, 2001



EU	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
5	3.7	3.1	2.9	4.3	3.1	3.4	6.8	3.1	4.1	7.5	2.2	2.8	3.9	5.8	7.9

Source: Eurobarometer Flash 102.

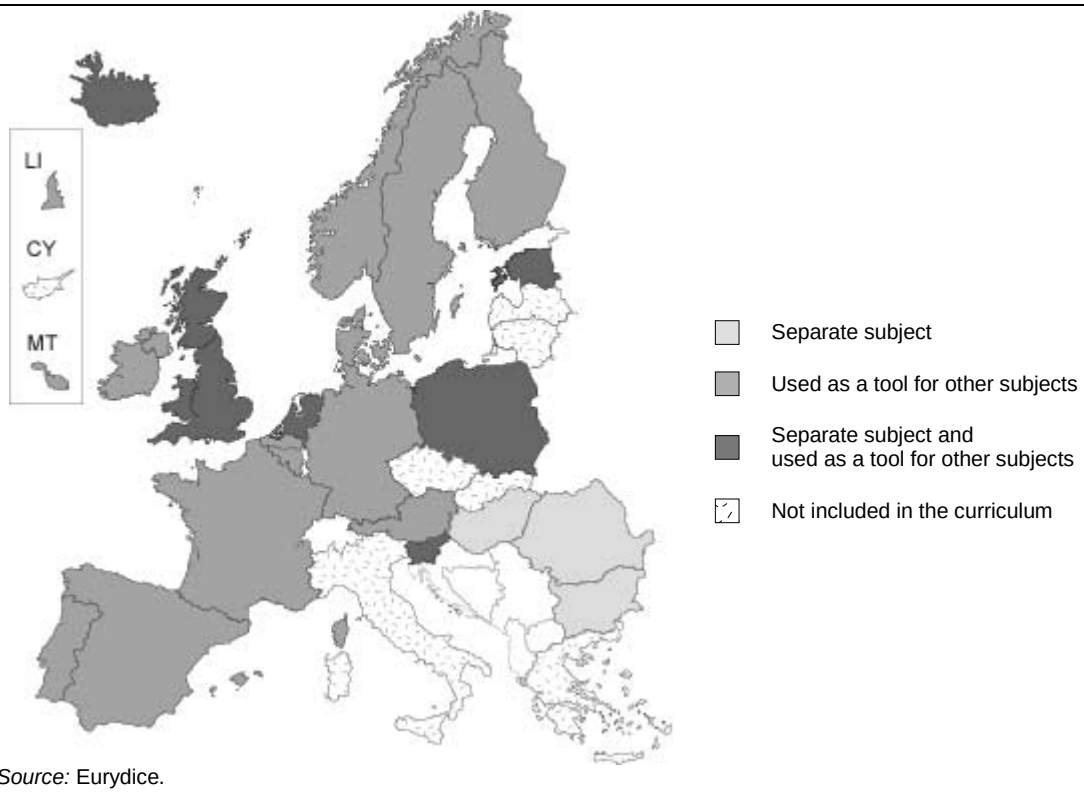
Explanatory note

Only teachers who state that they use computers with their pupils have been considered in calculating the average periods shown in this Figure.

THE MOST COMMON APPROACH TO ICT IN PRIMARY EDUCATION IS TO USE IT AS A TOOL

When ICT is included in the curriculum, two main approaches may be distinguished. It may be taught either as a separate subject in its own right, or used as a tool and/or, in some cases, for carrying out projects, interdisciplinary or otherwise. These latter two approaches are the most widespread in the EU countries that have brought it into the curriculum for primary education.

FIGURE 15: APPROACHES TO ICT DEFINED IN THE CURRICULUM.
PRIMARY EDUCATION (ISCED 1), 2000/01



Source: Eurydice.

Additional notes

Germany: The *Kultusministerkonferenz* and the legislation of the different *Länder* make recommendations on the use and the role of ICT in school life.
Greece: The Pedagogical Institute has encouraged the use of ICT in a pilot project involving 40 primary schools.
Spain: The curriculum merely issues recommendations on the use of ICT.
Luxembourg: ICT constitutes a learning tool increasingly incorporated in all subjects.
Netherlands: since school year 1998/99, CT is one of the horizontal skills targeted by the primary school curriculum.
United Kingdom (NI): ICT is a cross-curricular theme; ICT skills are to be developed across the curriculum.
Czech Republic: Basic minimum skills required are being drawn up for primary and lower secondary education.
Cyprus: ICT has been subject to experimentation since 1993, and introduced into 69 schools since September 2001.
Poland: Since 1998, ICT has been a compulsory subject in the 4th, 5th and 6th years.

ICT is a separate compulsory subject in some countries only: in the Netherlands, the United Kingdom (with the exception of Northern Ireland), as well as in Iceland and several pre-accession countries. In the Netherlands, the United Kingdom, Iceland, Estonia, Poland and Slovenia, recommendations regarding the use of ICT are given throughout the curriculum. By contrast**,** in Bulgaria, Hungary and Romania, it is included in the curriculum solely as a subject in its own right.

DEVELOPMENT OF PROGRAMMING SKILLS IS NOT A VERY WIDESPREAD OBJECTIVE AT PRIMARY LEVEL

Whatever the approach advocated, the objectives pursued by the teaching or the use of ICT at primary level can cover various categories. Four major fields are distinguished here, namely the development of programming ability, the use of software, information searches and communication via a network.

FIGURE 16: OBJECTIVES DEFINED IN THE CURRICULUM FOR THE TEACHING OR THE USE OF ICT. PRIMARY EDUCATION (ISCED 1), 2000/01

	B fr	B de	B nl	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
To develop programming skills		(–)			●	(–)				(–)	(–)						●
To learn correct use of a word processor, a spreadsheet, etc.	●	(–)		●	●	(–)		●	●	(–)	(–)	●	●		●	●	●
To learn to search for information on a CD-ROM, a network, etc.	●	(–)		●	●	(–)		●	●	(–)	(–)	●	●		●	●	●
To communicate via a network	●	(–)		●	●	(–)		●	●	(–)	(–)	●	●		●	●	●

	IS	LI	NO	BG	CZ	EE	CY	LV	LT	HU	MT	PL	RO	SI	SK
To develop programming skills				●	(–)		(–)	(–)	(–)				●	●	(–)
To learn correct use of a word processor, a spreadsheet, etc.	●	●	●	●	(–)	●	(–)	(–)	(–)		●	●	●	●	(–)
To learn to search for information on a CD-ROM, a network, etc.	●	●	●	●	(–)	●	(–)	(–)	(–)		●	●	●	●	(–)
To communicate via a network	●	●	●	●	(–)	●	(–)	(–)	(–)		●	●	●	●	(–)

Source: Eurydice.

(–): This subject is not included in the curriculum at this level of education.

Additional notes

Belgium (B nl): By the end of primary school, pupils are required to be able to use ICT and to process data.
Germany: The *Kultusministerkonferenz* and the legislation of the different *Länder* make recommendations on the use and the role of ICT in school life.
Spain: The curriculum does not specify any objectives, as ICT is used solely as a tool for other subjects and is not taught as a subject in its own right.
Netherlands: Since 1998/99, the new media have been part of the cross-curricular attainment targets for primary education; objectives have been defined in all areas except programming skills.
Portugal: The gradual incorporation of ICT into schools has only recently got under way and the curriculum included no objectives in 2000/01. Curricular objectives are being specified for all three stages of *ensino básico* with effect from the 2001/02 school year.
Finland: The curricula are designed at local level on the basis of the national core curriculum. The schools define the objectives and what is taught on the basis of the national guidelines.
Sweden: ICT is to be used as a tool in the classroom, although basic skills required for it are not listed.
United Kingdom (NI): The curriculum which makes no specific mention of 'communication via a network', is currently under review.
Bulgaria: Programming and communication via a network will appear only during the second part of the programme.
Cyprus: ICT has been introduced into 69 schools since September 2001. The main aim is to familiarise pupils with ICT so that they acquire basic skills.
Hungary: The curriculum aims to familiarise pupils with ICT and enable them to acquire basic skills.

With the exception of the Flemish Community of Belgium, Spain, Portugal, Cyprus and Hungary in which no objective is clearly specified, the recommendations generally cover the different categories of objectives. However, the development of programming ability is included at this level in the curricula of only a few countries (Germany, the United Kingdom, Bulgaria, Romania and Slovenia).

In the United Kingdom (except Scotland), curriculum objectives are defined in terms of the skills to be acquired and the functions to be accomplished through the use of ICT, rather than in terms of the particular tools, techniques and applications to be used.

ICT IS INCLUDED IN THE COMPULSORY CURRICULUM IN GENERAL SECONDARY EDUCATION IN MOST COUNTRIES

At both levels of secondary education, ICT is an integral part of the minimum curriculum in virtually all countries. Recommendations concerning ICT are more recent in some countries than in others: Germany was the first to introduce the subject into the entire curriculum for secondary education in the late 1970s, followed by Slovenia in the case of upper secondary education alone in 1974.

FIGURE 17: INCLUSION OF ICT IN THE CURRICULUM.
GENERAL SECONDARY EDUCATION (ISCED 2 AND 3), 2000/01

Source: Eurydice.

Additional notes

Belgium (B nl): ICT has been included in the curriculum for lower secondary education since the 1998/99 school year. At upper secondary level, ICT is not yet among the attainment targets, but skills that should be mastered by the end of this stage are currently being determined.
France, Austria, Czech Republic and **Slovakia**: In the case of upper secondary education, the information applies solely to the first year
Italy: There are no recommendations on the use of ICT in the curriculum, but one of the aims of the *Piano d'azione per la Società dell'informazione*, which is planning to supplement, strengthen and provide further funding for the *Programma di Sviluppo delle Tecnologie Didattiche* in 2001-2003, is that ICT should be used to improve the effectiveness of teaching/learning and the way it is organised in each subject, as well as for the acquisition of general skills.
Portugal: ICT has been part of the curriculum in secondary education since the adoption of the statutory order of 18 January 2001.
United Kingdom (E/W/NI): In *Key Stages 3* and *4* (compulsory secondary education), ICT is compulsory as a separate subject in England, and, as a cross-curricular theme embedded across the curriculum, in Northern Ireland. In Wales, it is a compulsory subject only in *Key Stage 3* (lower secondary education). There are no compulsory subjects in post-compulsory secondary education. In both Wales and Northern Ireland, ICT is generally available as an optional separate subject in *Key Stage 4*, as it is throughout England, Wales and Northern Ireland in post-compulsory education.
Czech Republic: In lower secondary education, ICT is an optional subject. It becomes a compulsory subject during the first year of upper secondary education and may be included in the curriculum in subsequent years if the school head decides that it should be.
Cyprus: ICT has been included in the curriculum at lower secondary level since the 2001/02 school year.
Lithuania: At upper secondary level, computer science courses are compulsory solely for pupils in natural sciences and arts classes in general education.
Malta: Although already existent in project form in 1998, ICT has been officially included in the curriculum since 1999.
Poland: In the case of upper secondary education, the information applies solely to the first or second years.
Slovakia: ICT is a compulsory subject in classes specialising in mathematics, physics and IT in upper secondary education.

Explanatory note

By curriculum is meant any official recommendation relating to the subjects to be taught, whether as compulsory subjects or those involving an element of choice on the part of pupils.

ICT has been part of the lower secondary curriculum in Greece and Scotland since the beginning of the 1980s, and included in certain branches of upper secondary education in Luxembourg since 1983. In the United Kingdom, ICT has been a statutory subject in England and Wales since the National Curriculum was first introduced into schools following legislation passed in 1988. In Northern Ireland, it has been a compulsory requirement (as an educational theme crossing subject boundaries) since the Northern Ireland Curriculum was implemented following legislation passed in 1989. The Flemish Community of Belgium (lower secondary education), Ireland, the Netherlands (upper secondary education), Sweden (upper secondary education), Liechtenstein and Malta brought the subject into their curricula in 1998 or 1999. In some countries, ICT is offered as an optional subject. It has only recently appeared in the curriculum in Portugal and Cyprus (lower secondary education).

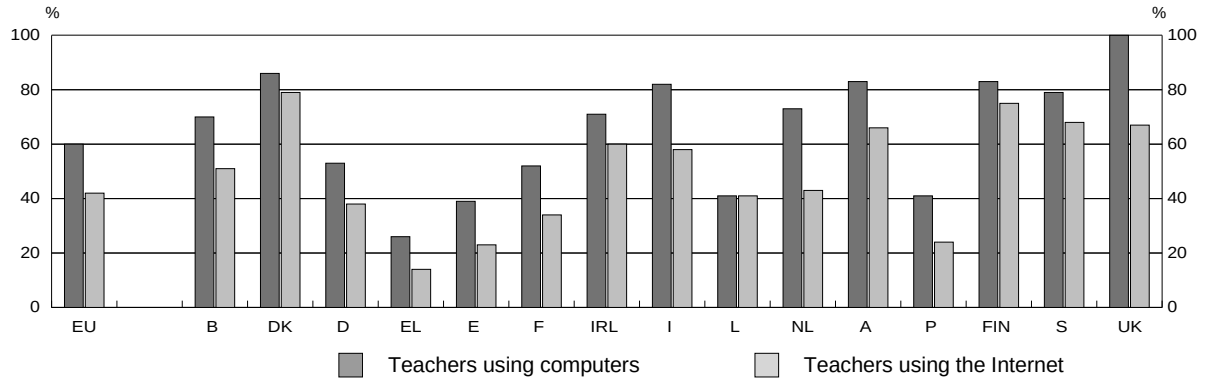
AT SECONDARY LEVEL, FEWER TEACHERS ON AVERAGE USE COMPUTERS IN THE CLASSROOM

Figure 17 shows that ICT is part of the minimum curriculum in (lower and upper) secondary education in almost all EU countries. The way teachers work bears witness to the inclusion of ICT as a subject or a teaching resource in curricula. Throughout the EU as a whole, the use of computers with pupils is undoubtedly less frequent than in primary education (corresponding to 60 % of teachers on average, instead of 71 %, see Figure 13), but disparities between countries are less marked at secondary level. However, percentages are especially high in Denmark, Austria, Finland, Sweden and the United Kingdom, as well as in Italy, in which ICT is not yet part of the compulsory secondary education curriculum.

In almost all EU countries, curricula for lower secondary and upper secondary education (Figures 22 and 24, respectively) refer to searching for information on a network or communicating via a network, as among the objectives to be pursued. Yet, on average, less than half of all teachers use the Internet with their pupils. The practice is therefore still not very widespread, except in some countries (Denmark and Finland).

Generally speaking, differences between the percentages of schoolteachers who use computers in the classroom and those who consult the Internet with their pupils are lower in secondary than in primary education. These differences are least marked in Denmark, Ireland, Luxembourg, Finland and Sweden. They are biggest in Greece, Spain, the Netherlands and Portugal.

FIGURE 18: PERCENTAGE OF TEACHERS WHO USE COMPUTERS AND/OR THE INTERNET IN THE CLASSROOM. SECONDARY EDUCATION (ISCED 2 AND 3), 2001



	EU	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
Teachers using computers	60	70	86	53	26	39	52	71	82	41	73	83	41	83	79	100
Teachers using the Internet	42	51	79	38	14	23	34	60	58	41	43	66	24	75	68	67

Source: Eurobarometer Flash 102.

Explanatory note

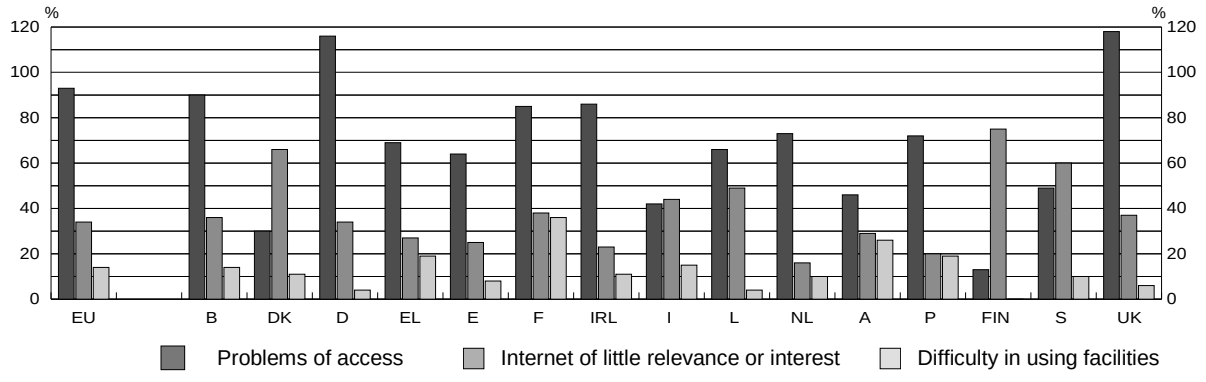
Teachers of computer science are included in the figures used to calculate these percentages.

NON-USE OF THE INTERNET BY TEACHERS IN THEIR CLASSES IS LARGELY ATTRIBUTABLE TO DIFFICULTY IN ACCESSING IT

The reasons given by teachers to explain why they do not use the Internet with their pupils relate in most cases to problems of access which may arise because their school is not equipped with computers or has no Internet connection, or because classrooms themselves do not provide for a connection. This factor is especially significant in Germany and the United Kingdom. Much less frequent are reasons concerned with the lack of relevance of the Internet to their teaching, either because teachers consider that there is no need to turn to the Web for the one or more subjects on which they work with their pupils, or because they believe that information available on the Internet is difficult to use because it is in a foreign language. The least commonly cited reasons are those related to lack of familiarity with the Internet on the part of pupils or the inability of teachers to use it. The foregoing ranking of factors is the same in the majority of EU countries. Yet in France, Austria and Portugal, reasons having to do with difficulty in using the Internet are relatively more significant and cited by 20 % of teachers and indeed, in France, by over a third.

However, in a few countries in which access to computers or the Internet is no longer a problem (Denmark, Finland and Sweden), and to a lesser extent in Italy, the most frequently given reasons are those having to do with the lack of relevance of the Internet or the information available on it.

FIGURE 19: REASONS GIVEN FOR NOT USING THE INTERNET WITH PUPILS. SECONDARY EDUCATION (ISCED 2 AND 3), 2001



	EU	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
Problems of access	93	90	30	116	69	64	85	86	42	66	73	46	72	13	49	118
Internet of little relevance or interest	34	36	66	34	27	25	38	23	44	49	16	29	20	75	60	37
Difficulty in using facilities	14	14	11	4	19	8	36	11	15	4	10	26	19	0	10	6

Source: Eurobarometer Flash 102.

Explanatory note

The reasons given by teachers for not using the Internet with pupils have been classified as follows:

– reasons related to problems of access (schools without computers or Internet connections, or classrooms without Internet connection facilities);

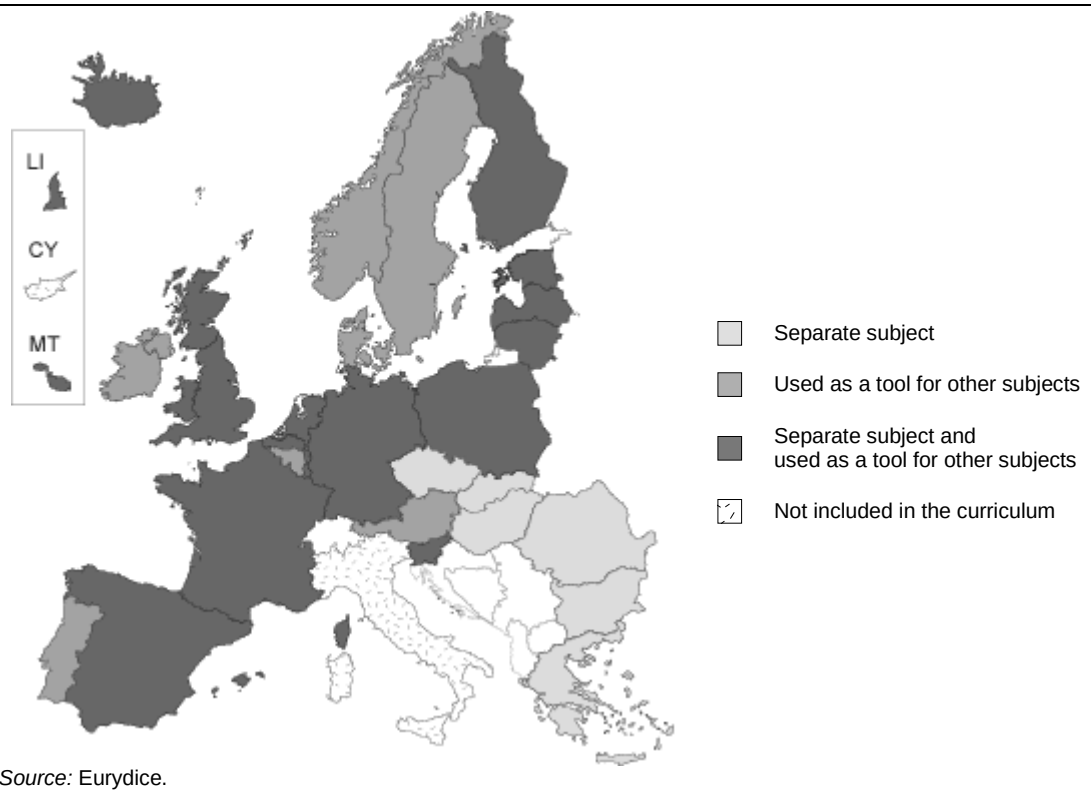
– those related to the relevance of the Internet and the information found on it (teachers do not find it helpful for work in their subject, or the information found on web sites is not in the language of the country concerned);

– those resulting from difficulty in using computer facilities (not enough pupils are familiar with the Internet, or the teacher does not know how to use it).

The percentages shown are sometimes over 100, because teachers were able to give several reasons for not using the Internet.

CURRICULA IN SEVERAL COUNTRIES SPECIFY THE NUMBER OF HOURS TO BE DEVOTED TO ICT AS A SEPARATE SUBJECT

FIGURE 20: APPROACHES TO ICT DEFINED IN THE CURRICULUM. GENERAL LOWER SECONDARY EDUCATION (ISCED 2), 2000/01



Source: Eurydice.

Additional notes

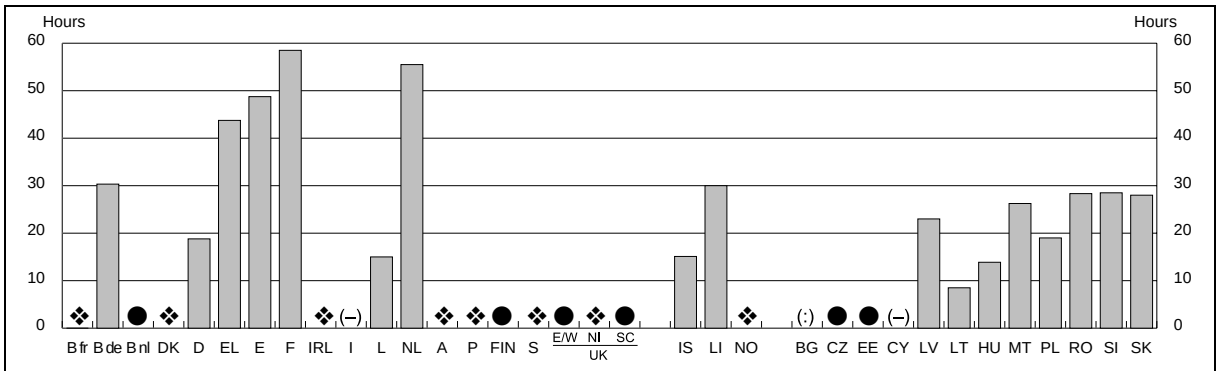
Finland: The curricula are prepared at local level on the basis of national guidelines. Schools can decide to include ICT in their curriculum as an elective subject.
Czech Republic: ICT is an optional subject offered at the discretion of the school head.
Estonia: Schools are free to decide whether ICT is used as a tool for other subjects or taught as a separate subject in its own right.
Cyprus: ICT is included in the curriculum with effect from the 2001/02 school year, but was nevertheless used as a tool for other subjects, such as graphic design technology and home economics, in 2000/01.

At this level of education, there are only a few countries in which the minimum curriculum does not include ICT as a subject in its own right. These countries include the French Community of Belgium, Denmark, Ireland, Austria, Portugal, Sweden, the United Kingdom (Northern Ireland) and Norway.

As in the case of primary education, these countries rely solely on ICT 'as a tool for other subjects'. By contrast, in lower secondary education, the majority of countries offer ICT as a separate subject in its own right and use it as a tool to teach other subjects. ICT is present solely as a separate subject in its own right in Greece and many pre-accession countries.

Comparisons may be established where ICT is included as a separate subject in the minimum curriculum for lower secondary education and there are official recommendations regarding the time to be devoted to it. Several factors have a bearing on the time devoted to ICT as a separate subject, including the duration of lower secondary education, the number of years during which ICT is offered as a separate subject, and the number of class periods recommended for instruction in it. Because these factors vary from one country to the next, the time to be devoted to ICT as a separate subject has been calculated with respect to a 'notional' year in lower secondary education. This average annual period varies enormously: in Spain, France and the Netherlands, it comes to over 40 hours, whereas in Germany, Luxembourg, Iceland, Lithuania, Hungary and Poland, the average recommended annual number of hours is less than 20. It should be noted that, in Germany and Lithuania, lower secondary education lasts six years.

FIGURE 21: ANNUAL NUMBER OF HOURS RECOMMENDED FOR TEACHING ICT AS A SUBJECT IN ITS OWN RIGHT. GENERAL LOWER SECONDARY EDUCATION (ISCED 2), 2000/01



	B fr	B de	B nl	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK E/W/NI	UK SC	IS	LI	NO	BG	CZ	EE	CY	LV	LT	HU	MT	PL	RO	SI	SK
		30.3			18.8	43.8	48.8	58.5		(–)	15	55.5							15.1	30.0		(:)			(–)	23.0	8.5	13.9	26.3	19.0	28.3	28.5	28.0

Source: Eurydice.

(–): This subject is not included in the curriculum at this level of education.

Additional notes

Belgium (B de): The data relates to the course in technology-assisted education.
Germany: Recommendations vary depending on the *Länder*. The data relates to the *Gymnasium* computer science course in the *Land* of Hessen. The number of hours devoted to this course is 45 in the *Hauptschule* and 61 in the *Realschule* and *Gesamtschule*.
Greece: The data relates to courses in computer science and technology. The number of hours devoted to them depends on the year of *Gymnasio* concerned.
Spain: The data relates to technology courses. The number of hours devoted to them depends on the stage of *educación secundaria obligatoria* concerned.
France: The data relates to technology courses. The number of hours devoted to them depends on the year of *Collège* concerned.
Luxembourg: The data relates to the course in the third year of lower general secondary education.
Netherlands: The data relates to technology courses and courses in information technology offered in the first three years of HAVO and VWO.
Finland: Although ICT is generally used as a tool to teach other subjects, schools may decide to include it in their courses as an optional subject in its own right.
United Kingdom (SC): During the first two years of lower secondary education, schools are free to decide whether they will offer ICT as a subject in its own right. During the last two years of lower secondary education, it is recommended that a certain number of hours should be set aside for technological activities and their applications. However, within this number of hours, it is impossible to identify the number devoted to the teaching of ICT.
Iceland: The data relates to courses in the use of computers, information technology, innovation and technical education, on offer in the eighth year of the single structure. During the following two years, ICT is used as a tool for other subjects.
Liechtenstein: The data relates to courses in media, life and trade studies provided during the four years of *Oberschule*. The number of hours devoted to them depends on the year of education concerned.
Czech Republic: ICT is an optional subject offered at the discretion of the school head. The number of hours is not specified.
Estonia: Schools are free to decide whether ICT is used as a tool for other subjects or taught as a separate subject in its own right.
Cyprus: Since the 2001/02 school year, ICT is a subject in its own right in the lower secondary education curriculum.
Latvia: Data relates to classes in the use of computers and information technology.
Lithuania: Data relates to the computer science course offered during the last two years of lower secondary education.
Hungary: Data relates to computer science and technology courses offered during the last two years of lower secondary education.
Malta: Data relates to the secondary school course. In the *Junior Lyceums*, the number of hours devoted to this course is 28.
Poland: The data relates to courses in technology and computer science.
Romania: The data relates to courses in technology.
Slovenia: The data relates to the ICT course offered during the last three years of the single structure.
Slovakia: The data relates to courses in technical education.

Explanatory notes

Figure 21 shows the number of hours devoted to teaching ICT as a subject in its own right in lower secondary education. In order to enable ready comparison between countries, this number of hours (60 minutes) is based on a notional year of lower secondary education.

The calculation thus takes account of the following:

– the number of periods devoted to teaching ICT as a subject in its own right, which are recommended in the curriculum or official guidelines;

– the length of a period (in minutes);

– the number of school days in a week and/or a year (depending on whether the number of periods relates to the amount of teaching in a week or a year);

– the number of years corresponding to the duration of lower secondary education.

Number of years corresponding to the duration of lower secondary education

B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK E/W/NI	UK SC
2	3	5-6	3	4	4	3	3	3	3	4	3	3	3	3	4

IS	LI	NO		BG	CZ	EE	CY	LV	LT	HU	MT	PL	RO	SI	SK
3	4	3		4	4	3	3	5	6	4	5	3	4	3	5

It should also be emphasised that, in the case of some countries, extra time may be granted to ICT over and above the minimum number of compulsory hours given in Figure 21, within the flexible part of the curriculum which schools are free to determine as they wish. Where schools are entirely free to determine the total number of hours earmarked for ICT, no estimate has been possible.

The results obtained in ICT are taken into account when deciding whether **pupils should progress to a higher class** in Germany (when the subject is compulsory or a core curriculum option), Spain, Luxembourg, Bulgaria, Estonia, Hungary, Poland, Romania, Slovenia and Slovakia.

Pupils are **externally assessed** in this subject in France (when they complete lower secondary education).

The knowledge and skills acquired are marked in each annual school report, or **formally certified** on completion of lower secondary education (or the single structure) in the German-speaking Community of Belgium, Germany, Luxembourg, Liechtenstein, the Czech Republic, Hungary, Poland, Slovenia and Slovakia.

THE RANGE OF CURRICULAR OBJECTIVES REMAINS QUITE BROAD AT SECONDARY LEVEL

FIGURE 22: OBJECTIVES DEFINED IN THE CURRICULUM FOR THE TEACHING OR USE OF ICT. GENERAL LOWER SECONDARY EDUCATION (ISCED 2), 2000/01

	B fr	B de	B nl	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
To develop programming skills				●	●	●			●	(–)							●
To learn correct use of a word processor, a spreadsheet, etc.	●	●		●	●	●	●	●	●	(–)	●	●	●		●	●	●
To learn to search for information on a CD-ROM, a network, etc.	●	●		●	●	●	●	●	●	(–)	●	●	●		●	●	●
To communicate via a network	●	●		●	●	●	●	●	●	(–)	●	●	●		●	●	●

	IS	LI	NO	BG	CZ	EE	CY	LV	LT	HU	MT	PL	RO	SI	SK
To develop programming skills		●		●	●		(–)	●	●	●			●	●	●
To learn correct use of a word processor, a spreadsheet, etc.	●	●	●	●	●	●	(–)	●	●	●	●	●	●	●	●
To learn to search for information on a CD-ROM, a network, etc.	●	●	●	●	●	●	(–)	●	●	●	●	●	●	●	●
To communicate via a network	●	●	●	●	●	●	(–)	●	●	●	●	●	●	●	●

Source: Eurydice.

(–): This subject is not included in the curriculum at this level of education.

Additional notes

Portugal: The gradual incorporation of ICT into schools has only recently got under way and the curriculum included no objectives in 2000/01. Curricular objectives are being specified for all three stages of *ensino básico* with effect from the 2001/02 school year.
Finland: The curricula are designed at local level on the basis of the national core curriculum. The schools determine the objectives and what is to be taught, on the basis of the national guidelines. Courses to develop programming skills are offered in some schools.
United Kingdom (NI): The curriculum, which does not make specific mention of communication via a network, is under review.
Cyprus: With effect from the 2001/02 school year, ICT is included in the curriculum and covers the four areas shown.

In general, the **objectives** of the courses in ICT at lower secondary level concern the four categories shown in Figure 22. However, the development of programming skills is not specified at this level of education in many countries. In the United Kingdom (England and Wales), curricular objectives are defined in terms of the skills to be acquired and functions to be accomplished through the use of ICT, rather than in terms of particular tools, techniques and applications to be used.

In addition to these major categories, the German curriculum includes courses to build awareness of the history of technologies, the problems of intellectual property and the role of the computer in the world of work. In Spain, the Netherlands, the United Kingdom (England, Wales and Northern Ireland), Liechtenstein and the Czech Republic, the curriculum also emphasises the value or reliability of information and the role of ICT within society.

ICT IS TAUGHT AS A SEPARATE SUBJECT IN ALMOST ALL COUNTRIES IN GENERAL UPPER SECONDARY EDUCATION

FIGURE 23: APPROACHES TO ICT DEFINED IN THE CURRICULUM. GENERAL UPPER SECONDARY EDUCATION (ISCED 3), 2000/01

Source: Eurydice.

Additional notes

Belgium (B fr): ICT constitutes a tool for disciplinary and multidisciplinary learning in general upper secondary education, but is sometimes included as a separate subject in certain optional courses in transitional technical education.
Belgium (B nl): Attainment targets for upper secondary level are currently being drawn up.
Greece: ICT is used as a tool for teaching other subjects in vocational/technological institutions.
France: Only in the first year of upper secondary education is ICT both taught as a separate subject in its own right and used as a tool for other subjects. In the subsequent years, it is used solely as a tool to teach other subjects.
Luxembourg: In the fourth year of general secondary education, ICT is taught solely as a separate subject in its own right. In the subsequent years, it is used as a tool for other subjects.
Finland: The curricula are designed at local level on the basis of national guidelines. Schools may decide to include ICT as an optional subject in their curriculum.
Sweden: ICT is a separate subject in certain upper secondary education curricula.
United Kingdom (E/W/NI): In *Key Stage 4* (the first two years of upper secondary education), ICT is a compulsory separate subject in England only, but is generally available as an optional separate subject in both Wales and Northern Ireland. In post-compulsory education, ICT is an optional separate subject throughout England, Wales and Northern Ireland.

In general upper secondary education, ICT is taught solely as a separate subject in its own right in a few countries (Greece, Bulgaria, the Czech Republic, Malta, Hungary, Romania and Slovakia) and less frequently used exclusively as a tool for other subjects (Ireland and United Kingdom (Northern Ireland and Wales)). In the majority of cases, national curricula combine the two approaches, and recommend or prescribe that the teaching of ICT as a separate subject should be supplemented by its use as a tool for other subjects or for carrying out interdisciplinary projects.

The results obtained in this subject are taken into account for **progression** to the next year in Germany (when the subject is compulsory or a core curriculum option), Spain, Luxembourg, Austria, Portugal and in all the pre-accession countries with the exception of Latvia and Cyprus.

An **external assessment** is organised for this subject in Luxembourg (for certain course options), the United Kingdom (Scotland), Norway, Bulgaria (in some specialised secondary schools) and Hungary. In the Netherlands, ICT has been a subject for optional examination since the 1998/99 school year. In the United Kingdom (England, Wales and Northern Ireland), students who study ICT in the first two years of upper secondary education (i.e. last two years of compulsory education) may take an externally

certificated qualification (for example a GCSE) in this subject, but this is not compulsory. Students who choose to study ICT in post-compulsory upper secondary education normally take an externally certificated qualification (for example GCE AS or A level) in this subject. Other post-compulsory upper secondary students may now take a *Key Skills Qualification*, alongside other qualifications.

A grade in the annual school report or a **certificate** at the end of general upper secondary education is awarded on the basis of the knowledge and skills acquired in this subject in the German-speaking Community of Belgium, Denmark, Germany, Luxembourg, Austria, Finland (if a specific ICT course is included in the study programme), Portugal, the United Kingdom (Scotland), Liechtenstein, the Czech Republic, Lithuania, Hungary, Poland, Romania (in upper secondary education specialising in ICT), Slovenia and Slovakia.

PROGRAMMING IS INCLUDED IN A GREATER NUMBER OF CURRICULA AT UPPER SECONDARY LEVEL

FIGURE 24: OBJECTIVES DEFINED IN THE CURRICULUM FOR THE TEACHING OR THE USE OF ICT. GENERAL UPPER SECONDARY EDUCATION (ISCED 3), 2000/01

	B fr	B de	B nl	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK (E/W/NI)	UK (SC)
To develop programming skills			(–)	●	●	●			●	(–)	●				●	●		●
To learn correct use of a word processor, a spreadsheet, etc.	●	●	(–)	●	●	●	●	●	●	(–)	●	●	●	●	●	●		●
To learn to search for information on a CD-ROM, a network, etc.	●	●	(–)	●	●	●	●	●	●	(–)	●	●	●		●	●		●
To communicate via a network	●	●	(–)	●	●	●	●	●	●	(–)	●	●	●		●	●		●

	IS	LI	NO	BG	CZ	EE	CY	LV	LT	HU	MT	PL	RO	SI	SK
To develop programming skills	●	●		●	●		●	●	●	●	●	●	●	●	●
To learn correct use of a word processor, a spreadsheet, etc.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
To learn to search for information on a CD-ROM, a network, etc.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
To communicate via a network	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Source: Eurydice.

(–): This subject is not included in the curriculum at this level of education.

Additional notes

Denmark: *Gymnasium* and *HF* courses.
Finland: The curricula are designed at the local level on the basis of the national core curriculum. The schools determine the objectives and what is to be taught, on the basis of the national guidelines.
Sweden: Optional courses to develop programming skills may be offered in upper secondary level.
United Kingdom (E/W/NI): In England, in *Key Stage 4* (the first two years of upper secondary education) particular ICT tools and information sources are not specified; the curriculum emphasises the need to choose appropriate ICT tools and information sources and to use them effectively to achieve a range of purposes. ICT is not a statutory subject in Wales or Northern Ireland at this level of education, but must be used as appropriate across the curriculum.
Iceland: The aim of developing programming skills does not apply to all students in general upper secondary education.
Poland: The objective entitled 'development of programming ability' is optional.

Among the countries that have incorporated ICT into the curriculum of general upper secondary education, most pursue all categories of **objectives** shown in Figure 24 This trend is particularly striking in the pre-accession countries. However, the development of programming skills is not specified at this level of education in the French-speaking and German Communities of Belgium, Spain, France, the Netherlands, Austria, Portugal, Norway and Estonia. It is very uncommon for communication via a network not to be one of the objectives or key skills, except in Portugal where the use of software is the only specific objective targeted.

TEACHERS WHO HAVE SPECIALISED IN ICT WORK MAINLY AT SECONDARY LEVEL

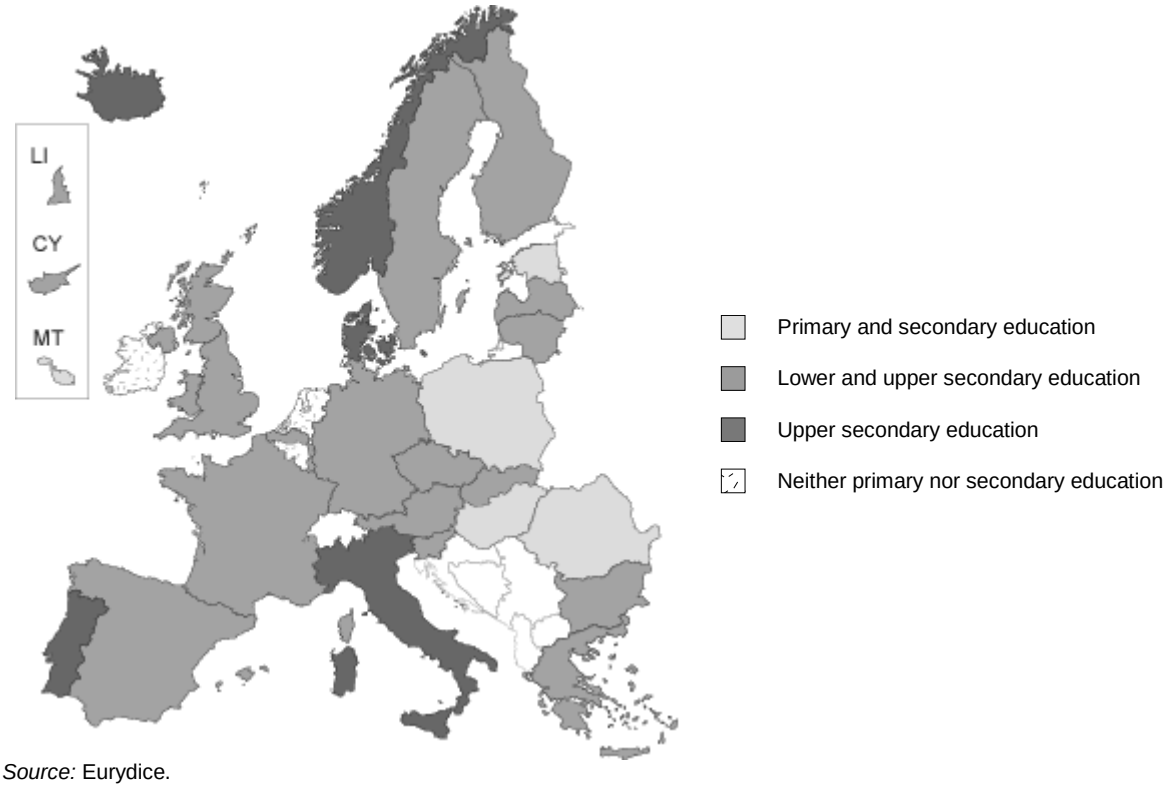
Teachers who are subject specialists in information and communication technology are responsible for teaching this subject at primary level in only a few pre-accession countries (Estonia, Hungary, Malta, Poland and Romania).

By contrast, teachers who have specialised in ICT are employed in secondary education in the great majority of countries. In Denmark, Italy, Portugal, Iceland and Norway, they are responsible for teaching ICT at upper secondary level only.

However, the French Community of Belgium and Ireland do not train specialist teachers in ICT for any of the levels of education covered by Figure 25. In the Netherlands, teachers at primary and secondary level may receive special training in ICT lasting for one year after their initial training. On its completion, they are given the title of ICT coordinator.

The initial training of teachers specialising in ICT is in most cases provided at university level. ICT specialist teachers in Liechtenstein are trained in upper secondary education. Depending on the level of education at which they are to teach, some specialist teachers in the German-speaking and Flemish Communities of Belgium, Austria, Latvia, Hungary and Poland may be trained in non-university tertiary education. The training of specialist ICT teachers lasts from one-and-a-half to 2 years in Austria *(Hauptschule)* to 7 years in Luxembourg.

FIGURE 25: SPECIALIST ICT TEACHERS.
PRIMARY AND SECONDARY EDUCATION (ISCED 1, 2 AND 3), 2000/01



Source: Eurydice.

Additional notes

Belgium (B nl): When teachers in lower secondary education have completed their basic training, they may go on to courses in which they specialise in ICT.
France: Courses in secondary education are given by university-trained teachers in technology (but not solely ICT).
Luxembourg: In secondary education, ICT courses are given by engineers or university staff who have specialised in computer science.
Malta: All teachers at primary level specialise in ICT. At lower secondary level, this applies only to mathematics teachers.

ICT IS STILL NOT UNIVERSALLY COMPULSORY IN INITIAL TEACHER TRAINING

In over half of the European countries, **training in ICT is compulsory** for all **future teachers** whether they are intending to work in primary education (Figure 26), lower secondary education (Figure 27) or upper secondary education (Figure 28).

In some countries, institutions are totally free to devise and structure their course of training as they wish. Depending on the institution concerned, therefore, training in ICT may be a compulsory subject, a core curriculum option or an optional subject. This applies to the initial training of teachers for different levels of education in Ireland, Portugal until 2001/02, the Czech Republic, Hungary, Poland and Romania.

In Spain and in the United Kingdom (Wales and Northern Ireland), all those intending to teach at primary level receive training in ICT. On the other hand, corresponding provision for future secondary school teachers depends on the institution at which they undertake their initial training.

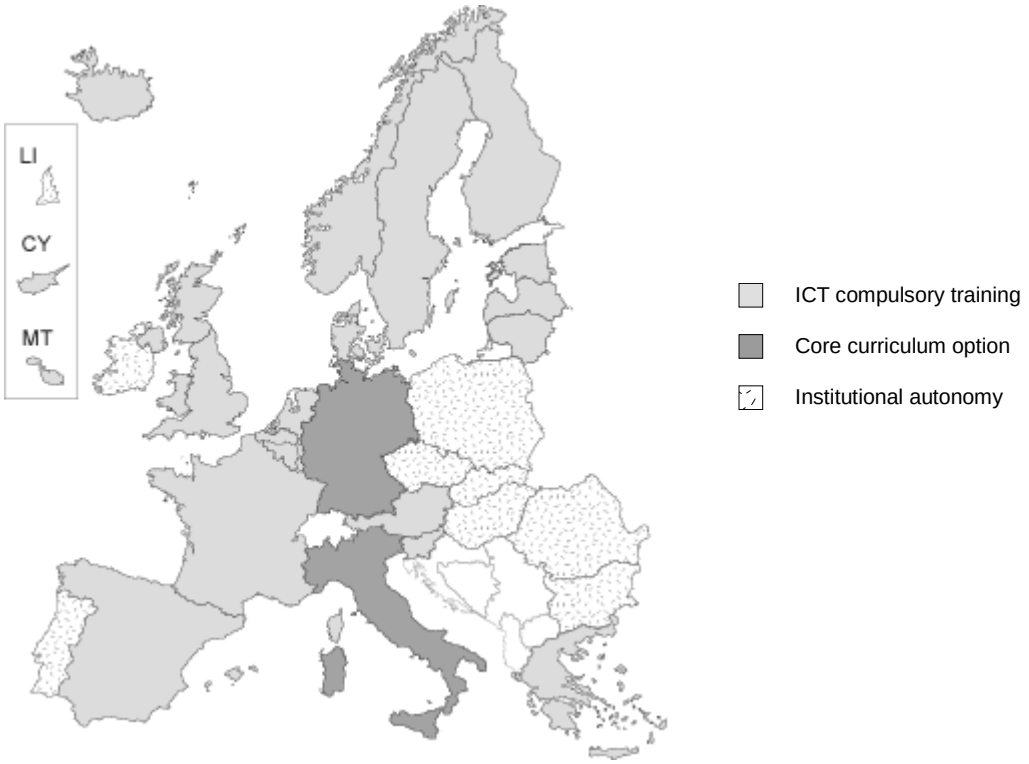
In the French and German-speaking Communities of Belgium, training in ICT is compulsory for all those intending to teach at primary and lower secondary levels whereas, until the start of the 2001/02 school year, training institutions themselves decided whether to train future teachers in upper secondary education.

In Slovakia, initial training of secondary school teachers has to include ICT-related training, whereas the inclusion of ICT in the initial training of primary school teachers depends on the institution they attend.

In a few countries, training in the teaching of ICT is one of the core curriculum options. The training institutions concerned are thus obliged to offer the subject, but it is left to the trainees to decide whether or not to include it in their overall course of training. In Germany and in Italy, this applies to the initial training of all primary and secondary school teachers whereas, in Liechtenstein and in Bulgaria the same formula is limited to the training of secondary school teachers and, in Austria, solely to those intending to work at upper secondary level.

In Greece, only teachers in primary education currently receive compulsory training in the teaching of ICT. At secondary level, this training is not provided.

FIGURE 26: INCLUSION OF ICT IN THE INITIAL TRAINING OF ALL TEACHERS (EXCEPT SPECIALIST ICT TEACHERS). PRIMARY EDUCATION, 2000/01



Source: Eurydice.

Additional notes

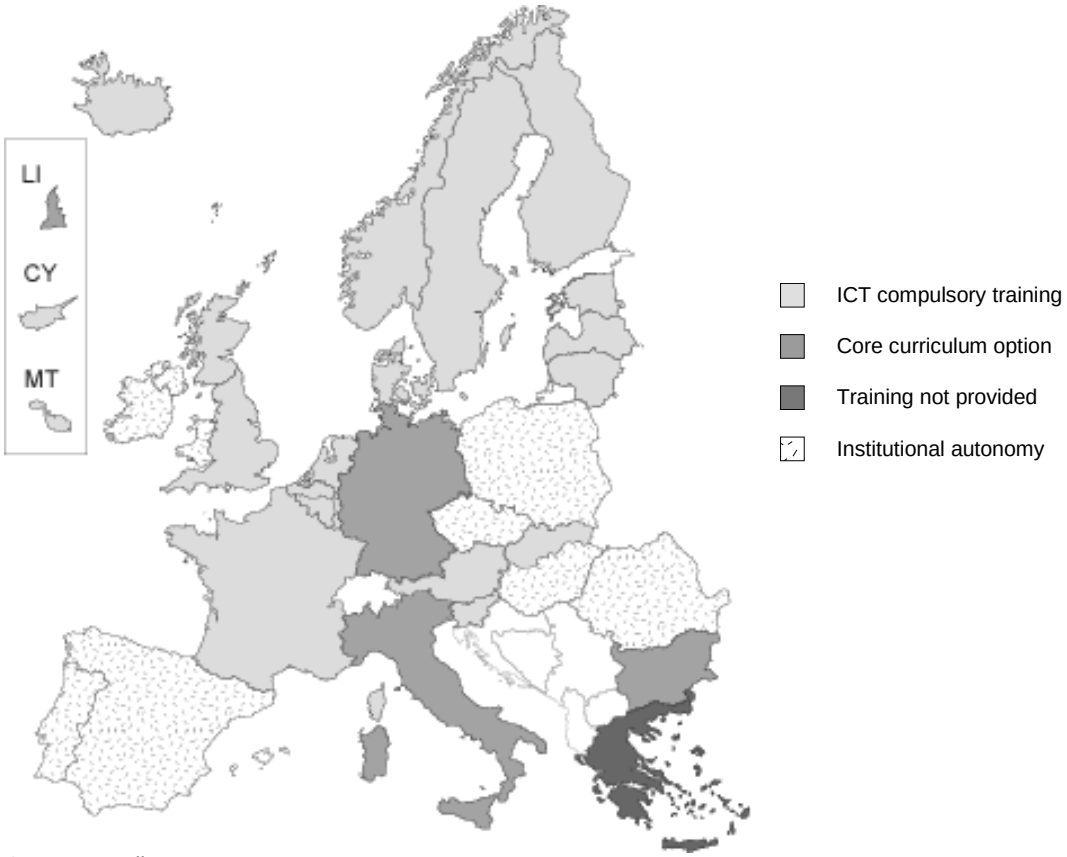
Belgium (B nl) and **Netherlands**: Compulsory teacher training in ICT is concerned with basic skills.
Portugal: Initial training in ICT will be compulsory for all future teachers from the start of the 2001/02 school year, and institutions will therefore be obliged to provide it.
United Kingdom (E/W/NI): Intending primary teachers are trained to be able to teach all subjects in the curriculum, including ICT. In addition, an Initial Teacher Training National Curriculum for the use of ICT in teaching other subjects was introduced in England in September 1998. In Wales, the possibility of introducing similar arrangements is under review. There is no corresponding proposal for Northern Ireland, but ITT providers are implementing a strategy for teachers to achieve equivalent competence.
Estonia: An official document on the general skills expected of teachers, which was adopted in November 2000, includes ICT in their training, in line with the 1998 Ministry of Education regulation emphasising the development of skills and the use of ICT in class.

Explanatory note

The term 'core curriculum option' refers to one of a range of subjects offered by training institutions, from which trainees have to select a limited number in order to cover part of their compulsory minimum curriculum. As used here, the term also implies that all institutions are obliged to include ICT in this range of subjects.

'Institutional autonomy' means that training institutions are free to decide whether training in ICT is compulsory or otherwise.

FIGURE 27: INCLUSION OF ICT IN THE INITIAL TRAINING OF ALL TEACHERS (EXCEPT SPECIALIST ICT TEACHERS). LOWER SECONDARY EDUCATION (ISCED 2), 2000/01



Source: Eurydice.

Additional notes

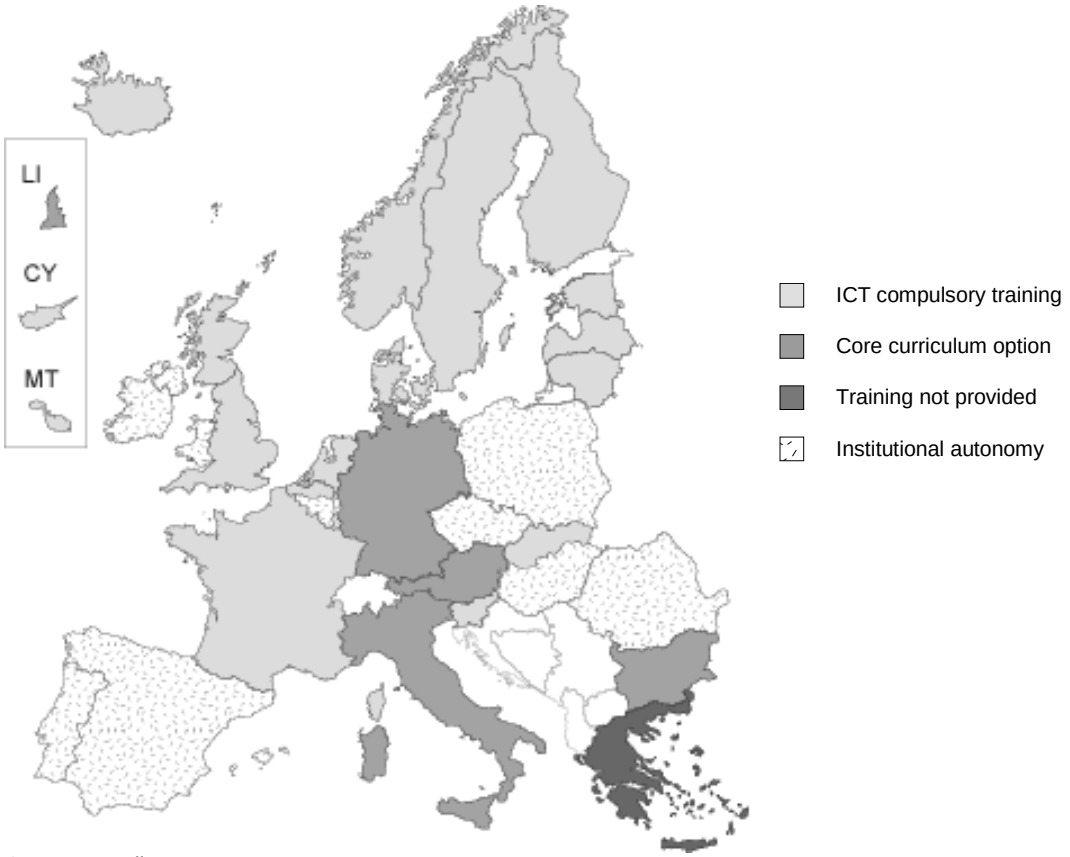
Belgium (B nl) and **Netherlands**: Compulsory teacher training in ICT is concerned with basic skills.
Luxembourg and **Cyprus**: The situation relates solely to the final 'on-the-job' qualifying phase.
Portugal: Initial training in ICT will be compulsory for all future teachers from the start of the 2001/02 school year, and institutions will therefore be obliged to provide it.
United Kingdom (E/W/NI): An Initial Teacher Training (ITT) National Curriculum for the use of ICT in teaching other subjects was introduced in England in September 1998. In Wales, the possibility of introducing similar arrangements is under review. There are no plans for statutory requirements in Northern Ireland, but ITT providers are implementing a strategy to achieve equivalent teacher competence.
Estonia: An official document on the general skills expected of teachers, which was adopted in November 2000, includes ICT in their training, in line with the 1998 Ministry of Education regulation emphasising the development of skills and the use of ICT in class.

Explanatory note

The term 'core curriculum option' refers to one of a range of subjects offered by training institutions, from which trainees have to select a limited number in order to cover part of their compulsory minimum curriculum. As used here, the term also implies that all institutions are obliged to include ICT in this range of subjects.

'Institutional autonomy' means that training institutions are free to decide whether training offered in ICT is compulsory or otherwise.

FIGURE 28: INCLUSION OF ICT IN THE INITIAL TRAINING OF ALL TEACHERS (EXCEPT SPECIALIST ICT TEACHERS). GENERAL UPPER SECONDARY EDUCATION (ISCED 3), 2000/01



Source: Eurydice.

Additional notes

Belgium (Bfr, B de): The training of teachers for upper secondary education will include training in ICT from 2001/02.
Belgium (B nl) and **Netherlands**: Compulsory teacher training in ICT is concerned with basic skills.
Luxembourg and **Cyprus**: The situation relates solely to the final 'on-the-job' qualifying phase**.**
Portugal: Initial training in ICT will be compulsory for all future teachers from the start of the 2001/2002 school year, and institutions will therefore be obliged to provide it.
United Kingdom (E/W/NI): An Initial Teacher Training (ITT) National Curriculum for the use of ICT in teaching other subjects was introduced in England in September 1998. In Wales, the possibility of introducing similar arrangements is under review. There are no plans for statutory requirements in Northern Ireland, but ITT providers are implementing a strategy to achieve equivalent teacher competence.
Estonia: An official document on the general skills expected of teachers, which was adopted in November 2000, includes ICT in their training, in line with the 1998 Ministry of Education regulation emphasising the development of skills and the use of ICT in class.

Explanatory note

The term 'core curriculum option' refers to one of a range of subjects offered by training institutions, from which trainees have to select a limited number in order to cover part of their compulsory minimum curriculum. As used here, the term also implies that all institutions are obliged to include ICT in this range of subjects.

'Institutional autonomy' means that training institutions are free to decide whether training offered in ICT is compulsory or otherwise.

THE AMOUNT OF TEACHING RELATED TO ICT IN THE INITIAL TRAINING OF TEACHERS FOR LOWER SECONDARY EDUCATION IS OFTEN DETERMINED BY THEIR TRAINING INSTITUTION

In some countries, training institutions are free to offer training in ICT to future teachers in general lower secondary education (Figure 27) and may decide to organise this provision as a compulsory subject, a core curriculum option or an optional subject. In all such instances, institutions are also free to decide on the number of hours of teaching devoted to ICT. This situation is encountered in Spain, Ireland, Portugal (until 2001/02), the Czech Republic, Hungary, Poland and Romania.

In many countries in which ICT is a **compulsory** component of the initial training of all teachers for lower secondary education, it is not possible to indicate the proportion of time devoted to ICT in the curriculum because of the autonomy of institutions in determining the amount of teaching involved. There is no recommendation establishing a minimum amount of teaching to be set aside for ICT. This applies to the Flemish Community of Belgium, Denmark, France, the Netherlands, Austria, Finland, the United Kingdom, Latvia and Slovakia.

In Germany, Italy and Bulgaria, teacher training courses in ICT are **core curriculum options**. Institutions are free to decide on the amount of teaching in the timetable that should be devoted to these core curriculum options.

Finally, in the German-speaking and French Communities of Belgium and in Norway, courses in ICT are compulsory but their content is an integral part of other subjects.

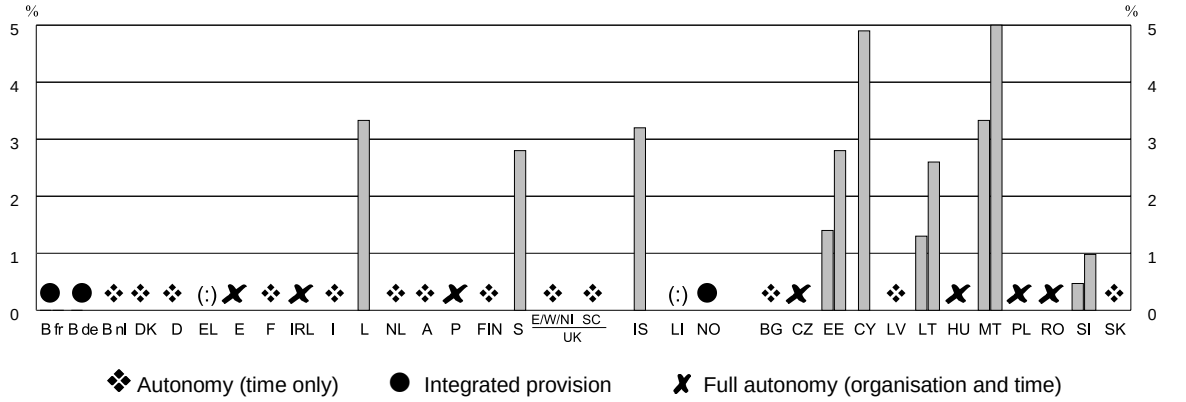
The time officially recommended for ICT courses in initial training can only be calculated in the case of a few countries (Luxembourg, Sweden, Iceland, Estonia, Cyprus, Lithuania, Malta and Slovenia). Such calculations are generally estimates and variations may exist from one institution to the next. Differences in the proportion of time devoted to ICT may be twice as much in some of these countries as in others and the proportion is especially high in Cyprus and in some institutions in Malta.

It should therefore be noted that, in all these countries, training of lower secondary education teachers is based on the concurrent model, except in the case of Luxembourg and Cyprus. In the former, solely the professional stage of training based on the consecutive model is nationally provided.

The percentage share of ICT in teacher training is no pointer to the actual number of hours devoted to it. This varies enormously and there is no correlation between it and the foregoing percentage. This is largely attributable to differences, from one country to the next, in the amount of time in the entire compulsory curriculum for initial teacher training.

The total amount of time earmarked for ICT in training is greatest in Sweden, followed by Estonia and Lithuania.

FIGURE 29: PERCENTAGE SHARE OF COMPULSORY TEACHING RELATED TO ICT, AND THE NUMBER OF HOURS DEVOTED TO SUCH TEACHING, IN THE INITIAL TRAINING OF ALL TEACHERS (EXCEPT SPECIALIST ICT TEACHERS). LOWER SECONDARY LEVEL (ISCED 2), 2000/01



		L	S	IS	EE	CY	LT	MT	SI	
Number of compulsory hours	total	450	7 200	2 480	5 760	567	6 080	1 680	2 374	2 288
	ICT	15	200	80	80 or 160	28	80 or 160	56 or 84	11.3	22.5
Percentage		3.33	2.8	3.2	1.4 or 2.8	4.9	1.3 or 2.6	3.33 or 5	0.5	1

Source: Eurydice.

Additional notes

Germany: It is each *Land*, and not its individual institutions, that is autonomous.
Luxembourg: The amount of time calculated relates solely to the final 'on-the-job' qualifying phase, given that this is the only phase offered in Luxembourg.
Portugal: Initial training in ICT will be compulsory for all future teachers from the start of the 2001/02 school year, and institutions will therefore be obliged to provide it.
Sweden: The calculation is based on an average of five units. One unit represents a week, which normally corresponds to 40 hours.
Iceland: The amount of time indicated relates to the training of student teachers enrolled at the Iceland University of Education *(Kennaraháskóli Íslands*).
Estonia: The amount of time indicated relates to the concurrent model, which is the most widespread.
Estonia, Lithuania, Malta and **Slovenia**: Differences in the percentage shares and amounts of time indicated generally correspond to variations between one institution and the next. In Slovenia, these percentages and amounts also depend on the courses for the particular subject(s) which trainees are intending to teach.
Cyprus: The amount of time calculated relates solely to the final 'on-the-job' qualifying phase.

Explanatory note

Definition of concepts used in the key:

Autonomy: ICT is part of the compulsory curriculum or is a core curriculum option, but training institutions are free to decide how much time should be devoted to each subject in the curriculum.
Integrated provision: ICT-related teaching is compulsory, but an integral part of provision in other subjects.
Full autonomy: Institutions are free to decide whether or not they offer courses in ICT and if they do so, they are free to decide the amount of time devoted to ICT.
Calculation: The numbers of units devoted to ICT are expressed as percentages of the total number of compulsory training units. These units are also expressed in hours.
In the case of the consecutive model of training, the share of teaching devoted to ICT refers solely to the professional stage of training.

THE LEVEL OF DETAIL IN OFFICIAL RECOMMENDATIONS ON THE TEACHING OF ICT VARIES FROM ONE COUNTRY TO THE NEXT

The freedom of training institutions to specify the ICT-related skills that future teachers should acquire is not as widespread as their freedom to determine the amount of teaching time devoted to ICT.

In some countries (Spain, Ireland, Portugal until 2002, the Czech Republic, Hungary, Poland and Romania), institutions are fully autonomous as regards the provision of ICT-related teaching. Not only are they free to decide whether to offer it and, if they do, to specify its content, but they are equally free to determine how much time should be devoted to such teaching.

In some countries, the recommendations of the educational authorities do no more than state that teaching about ICT is compulsory, without specifying what skills should be developed and what content should be included. This applies to the French and German-speaking Communities of Belgium, Denmark, Austria and Finland, but also to Italy and Bulgaria – two countries in which ICT-related courses are a core curriculum option. These are also the countries in which the amount of time devoted to the compulsory teaching of ICT cannot be identified, in the majority of cases because institutions are autonomous as shown in the preceding indicator.

In countries in which teaching in the field of ICT is governed by documents which describe the skills to be developed during initial training and/or the skills expected of teachers on the completion of training, the detail in the recommendations may vary from one country to the next. In most cases, such recommendations are very general in nature.

In Germany, the Netherlands, the United Kingdom, Norway and Slovenia all the fields referred to here are recommended.

In Luxembourg, Cyprus, Malta and Slovenia, the recommendations are also relatively precise. It is to be noted that, in these four countries, institutions have little room for manoeuvre as regards teaching about ICT from the standpoint of either its proportional share of the timetable, or the content of provision.

In France, the Netherlands and the United Kingdom, the content of training is determined to some extent by the standards specified for the award of the teaching qualification, although in England there is, in addition, a detailed curriculum for the use of ICT in teaching other subjects. However, the way in which the content is structured and delivered and the amount of time allocated depend largely on the individual institution.

In the majority of countries in which the areas to be taught are specified, as much importance is attached to a practical command of ICT for personal use, as mastery of it for teaching purposes. In Sweden, priority goes to teaching applications (which are compulsory). In the pre-accession countries, on the other hand, the emphasis placed on the value of ICT for personal use is greater, except in Slovenia.

The skills to which importance is most frequently attached during initial training of teachers for lower secondary education are the use of word processing and data processing programmes. Recommendations less frequently emphasise the command of skills such as the use of educational software and the Internet.

FIGURE 30: DESIRABLE ICT SKILLS ACCORDING TO OFFICIAL RECOMMENDATIONS FOR THE INITIAL TRAINING OF ALL TEACHERS (EXCEPT SPECIALIST ICT TEACHERS). LOWER SECONDARY EDUCATION (ISCED 2), 2000/01

	B fr	B de	B nl	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK (E, SC)	UK (W)
ACQUIRING SKILLS IN ICT FOR PERSONAL USE					●			●			●	●				○	●	●
Use of word-processing programmes					●			●			●	●				○	●	
Use of data-processing programmes					●			●			●	●				○	●	
Use of educational software programmes					●							●				○	●	
Use of the Internet					●			●				●					●	
ICT FOR TEACHING APPLICATIONS			●		●			●			●	●				●	●	●
Use of word-processing programmes					●			●				●				●	●	
Use of data-processing programmes					●			●				●				●	●	
Use of educational software programmes					●						●	●				●	●	
Use of the Internet					●			●			●	●					●	
NO RECOMMENDATIONS	●	●		●		(:)	●		●	●			●	●	●			

	IS	LI	NO	BG	CZ	EE	CY	LV	LT	HU	MT	PL	RO	SI	SK
ACQUIRING SKILLS IN ICT FOR PERSONAL USE	●		●			●	●	●	●		●			●	
Use of word-processing programmes			●				●				●			●	
Use of data-processing programmes			○								●			●	
Use of educational software programmes			●								●			●	
Use of the Internet			●				●				●			●	
ICT FOR TEACHING APPLICATIONS	●		●			●	●	●	●		●			●	●
Use of word-processing programmes			●											●	
Use of data-processing programmes			○											●	
Use of educational software programmes			●				○				●			●	
Use of the Internet			●				●							●	
NO RECOMMENDATIONS		(:)		●	●					●		●	●		

● Compulsory ● Institutional autonomy ○ Optional

Source: Eurydice.

Additional notes

France: The ministerial text on the use of ICT in IUFM states: 'The IUFM have an essential part to play in this development: they have to prepare all future teachers for the use of ICT and anticipate the skills any of them will need in the future, in order to incorporate them from now on in the various aspects of teacher training'.
Netherlands: The Ministry and the institutions have reached an official agreement under which the fields shown are compulsory.
Portugal: Initial training in ICT will be compulsory for all future teachers from the start of the 2001/02 school year, and institutions will therefore be obliged to provide it.
United Kingdom (NI): ICT for teaching applications only.
Lithuania: The minimum standards expected of teachers in the field of ICT are '…to acquire the basics of a modern information culture, in particular computer literacy, and be able to apply them in one's work'.
Malta: The field 'use of educational software' is only compulsory for the mathematics, sciences, history and social sciences subject areas.

Explanatory note

Definition of concepts used in the key:

Compulsory: Also includes core curriculum options.
Institutional autonomy: Teacher training institutions are free to decide whether or not they offer courses for these skills.
Optional: Subjects recommended as optional courses.

The categories and fields listed do not necessarily correspond to the precise titles of the courses in each country.

IN-SERVICE TRAINING: OFTEN AVAILABLE, RARELY COMPULSORY

All countries that train their teachers in the ICT have defined policies on in-service training in this field. Most countries have an official plan for in-service training in which updating ICT skills is a priority. In Germany, Latvia and Poland, updating ICT skills is part of an official plan but it is not regarded as a priority. Portugal, Bulgaria, the Czech Republic, Estonia, Cyprus and Romania are the exceptions, as they do not have official plans in this area.

At primary level, in-service training in the new technologies is a right and not an obligation for all teachers, whether they be general or specialist teachers. In the United Kingdom, the New Opportunities Fund ICT training programme (funded by the National Lottery) is intended to increase the expertise of all serving teachers in the use of ICT in their teaching, to the level of newly qualified teachers. In Liechtenstein, teachers are offered a training course in four stages (covering various kinds of desirable skills).

At secondary level, in-service training in ICT is compulsory solely for teachers who specialise in technology in Germany, Greece, Bulgaria and Latvia. The same applies to specialist teachers at upper secondary level in the German-speaking Community of Belgium and in Cyprus.

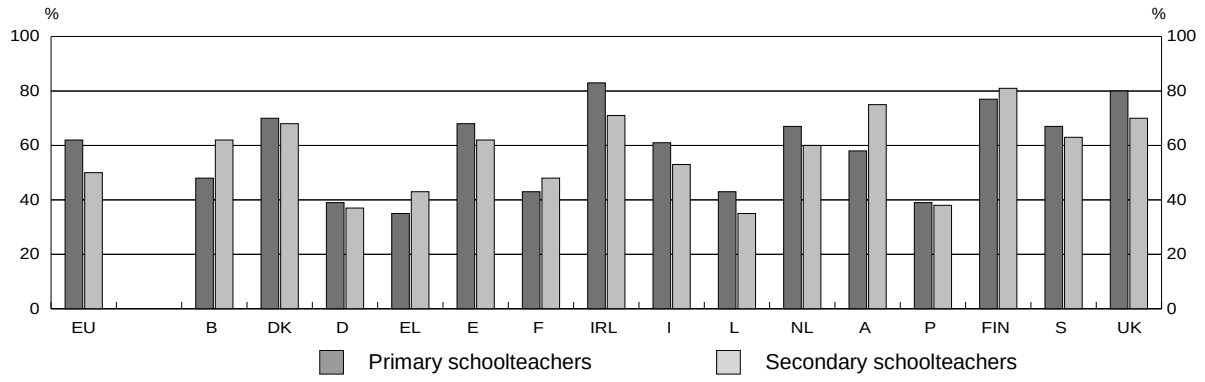
In Ireland, Finland and Sweden, at the different levels of education, there is a government initiative to give teachers support in acquiring and exploiting the opportunities provided by ICT. In Ireland, initiation into ICT through in-service training is not compulsory but has nevertheless attracted over 75 % of teaching staff to at least one of the training courses on offer. In the same way as in Finland (in the initiative organised as part of the national OPE.FI project), provision in Ireland makes it easier for teachers not only to acquire basic ICT skills but also to use them for teaching purposes. This final point relates to over half of all teaching staff in Finland. In Sweden, provision started in 1999 and involves 50 % of teachers.

AROUND HALF OF ALL TEACHERS HAVE UNDERGONE AN OFFICIAL TRAINING COURSE IN THE USE OF ICT IN THE CLASSROOM

Throughout the EU as a whole, more teachers in primary schools than their secondary school counterparts have completed an official training course on the use of computers or the Internet in teaching. This applies to Spain, Ireland, Italy, Luxembourg, the Netherlands and the United Kingdom. In some countries (Denmark, Germany, France, Portugal, Finland and Sweden), the percentages of primary and secondary schoolteachers who have received official training are not very different.

The countries in which a large proportion of schoolteachers (at both primary and secondary levels) have been trained in this way are Ireland, Finland and the United Kingdom. Conversely, fewer teachers at present in Germany, Greece, Luxembourg and Portugal than anywhere else say they have undergone official training.

FIGURE 31: PERCENTAGES OF PRIMARY SCHOOLTEACHERS (ISCED 1) AND SECONDARY SCHOOLTEACHERS (ISCED 2 AND 3) WHO HAVE RECEIVED OFFICIAL TRAINING IN THE USE OF COMPUTERS AND/OR THE INTERNET IN THEIR TEACHING, 2001



	EU	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
Primary schoolteachers	62	48	70	39	35	68	43	83	61	43	67	58	39	77	67	80
Secondary schoolteachers	50	62	68	37	43	62	48	71	53	35	60	75	38	81	63	70

Source: Eurobarometer Flash 102.

Explanatory note

The question put to teachers related to whether they received official training as either initial and/or in-service training, both of which may be officially provided. The length of time involved is not specified.

The age of teachers seems to have little bearing on whether or not they have received official training in the use of computers or the Internet. In the EU as a whole, the percentages of teachers who have had such training vary little with the age-group to which they belong. The youngest teachers have not received this kind of provision in any greater numbers than their elders, so ICT training would still not appear to be fully incorporated in the initial training of teachers at the start of their careers. Older teachers, for their part, have been able to benefit from official in-service training.

Similarly and, here again, in the EU as a whole, neither the sex of teachers nor, in the case of secondary schoolteachers, the subject they teach appears to have any bearing on whether or not they have undergone official training.

FIGURE 32: PERCENTAGES OF PRIMARY SCHOOLTEACHERS (ISCED 1) AND SECONDARY SCHOOLTEACHERS (ISCED 2 AND 3) IN THE EU WHO HAVE RECEIVED OFFICIAL TRAINING IN THE USE OF COMPUTERS AND/OR THE INTERNET IN THEIR TEACHING, 2001

	Primary schoolteachers who have been officially trained in the use of:		Secondary schoolteachers who have been officially trained in the use of:	
	Computers	The Internet	Computers	The Internet
20-29 years old	62 %	46 %	50 %	39 %
30-39	57 %	40 %	46 %	35 %
40-49	60 %	40 %	49 %	33 %
50 and over	62 %	37 %	47 %	30 %
Men	62 %	44 %	49 %	34 %
Women	60 %	39 %	47 %	32 %
Sciences	(–)	(–)	49 %	34 %
Social sciences	(–)	(–)	43 %	31 %
Humanities	(–)	(–)	44 %	27 %
Languages	(–)	(–)	52 %	37 %
Professional/technical courses	(–)	(–)	46 %	27 %
Computing	(–)	(–)	54 %	40 %
Others	(–)	(–)	44 %	31 %

Source: Eurobarometer Flash 102.

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