Edizioni
MENABÒ
DIDATTICA

European Teachers Towards the Knowledge Society

edited by Vittorio Midoro

Edizioni
MENABÒ
DIDATTICA

Published in
January 2005 by
MENABÒ s.r.l.
Via F.P. Cespa 102
66026 Ortona/Italy
tel. +39 085 9062001

Managing editor
Gaetano Basti

Graphic design & paging
MobyDick, Ortona/Italy

Printed by
Litografia Botolini s.r.l.
Rocca San Giovanni/Italy

ISBN 88-86396-70-8

Index

Contributors

UTEACHER PARTNERS
Vittorio Midoro, Stefania Bocconi, Jeff Earp,
Francesca Pozzi, Manuela Repetto
CNR- Istituto Tecnologie Didattiche, Italy (Prime Contractor)

Umberto Margiotta, Monica Banzato, Domenico Corcione, Alida Favaretto
SSIS Veneto - University of Venice, Italy

Allan Martin, John Dixon, Bob Byiers
The University of Glasgow, UK

NATIONAL INVESTIGATORS
AUSTRIA - *Hubert Egger*, PIB - bmbwk
BELGIUM - *Armand Greefs*, Karel de Grote Hogeschool
CZECH REPUBLIC - *Zdena Lustigova, Gabriela Hykova,* Charles University Prague
DENMARK - *Ulla Gjørling,* UNI•C
ENGLAND - *Kate Watson,* University of Exeter
FINLAND - *Jouni Kangasniemi*, Ministry of Education
FRANCE - *Georges-Louis Baron,* Université René Descartes - EDA Research team
GERMANY - *Edwin Stiller,* State Institute for schools
GREECE - *Giorgos Papadopoulos,* Hellenic Pedagogical Institute; *Michalis Karamanis* - Information Society SA
HUNGARY - *Andrea Kárpáti,* Eötvös University
ICELAND - *Kristín Helga Gudmundsdóttir,* Department of Continuing Education, Iceland University of Education
IRELAND - *Conor Galvin,* University College Dublin
ITALY - *Vittorio Midoro,* Istituto Tecnologie Didattiche, CNR
NORWAY - *Morten Søby,* Norwegian Network for IT - Research and Competence in Education, University of Oslo
PORTUGAL - *Cristina Novo,* Escola Superior de Educação de Santarém
SCOTLAND - *John Dixon,* I.T. Education Unit, University of Glasgow
SPAIN - *Juana M. Sancho (NI), Adriana Ornellas, Joan-Anton Sánchez, Silvina Casablancas,* Universitat de Barcelona
SWEDEN - *Carl Holmberg,* Swedish Agency for Flexible Learning
THE NETHERLANDS - *Pieter Hogenbirk*, Inspectorate of Education

Acknowledgements

Our thanks are due to Mrs. Claire Belisle (CNRS - France), external evaluator of the uTeacher project, for her advice and support.
We wish to thank the following people for helping to identify suitable national investigators.

INFORMATION SOURCES for the uTeacher Project
Helmut Stemmer - Austrian Federal Ministry of Education, Science and Culture, Austria
Herman Coene - Karel de Grote-Hogeschool, Department of Education, Belgium
Peter Bollerslev - IFIP Denmark, Denmark
Debra Myhill - University of Exeter, England
Odile de Chalendar - Ministère de la Jeunesse, de l'Education Nationale et de la Recherche, France
Dietlind Fischer - Comenius-Institut, Germany
Louisa Anastopoulos - Ministry of National Education & Religious Affairs, Greece
Kovács Emese - Tempus Public Foundation, Hungary
Arnor Gudmundsson - Ministry of Education, Science and Culture, Iceland
Mary Shine Thompson - St Patrick's College, Ireland
Ida Brandao - Ministéio da Educacao, Departamento de Avaliacao Prospectiva e Planeamento, Portugal
Allan Martin - University of Glasgow, Scotland
Lejo Swachten - Hogeschool van Utrecht - Faculty of Education, The Netherlands

Foreword

This book originates in the context of uTeacher, a project of the European e-Learning Initiative. The uTeacher partnership involves 3 partners: Istituto Tecnologie Didattiche (CNR, Genoa, IT), the contractor, SSIS Veneto (Università Ca' Foscari, Venice, IT) and the University of Glasgow (UK). The main aim of uTeacher is the definition of a Common European Framework on teachers' profile in ICT for Education. In Initial Teacher Education (ITE) and in the Continuing Professional Development (CPD) this framework will represent a means for educational administrators, course designers, teachers, examining bodies, etc. to reflect on their current practice, with a view to situating and co-ordinating their efforts and to ensuring that they meet the real needs of school in the knowledge society. In the near future, the framework could become a common basis for the elaboration of syllabuses, curriculum guidelines, examinations, textbooks, etc. across Europe.
To be accepted, this framework needs to result from a participatory approach, involving all European countries. Before starting this process, all the actors involved in framework production should have a clear overview of the current teachers' profile in ICT for Education underlying ITE and CPD initiatives across Europe.
This book aims to provide such an overview. It was written cooperatively by the uTeacher partnership, along with 19 European experts who in uTeacher are called "National Investigators" (NI).

The production process which led to the publication of this book comprised a series of coordinated activities designed to help gain a clear picture of the situation in each country regarding teachers' ICT profile underlying ITE and CPD, and to provide the opportunity for Europe-wide dialogue and comparison. These activities resulted in the drafting of national reports and of Week-long Seminar position papers reflecting trans-national perspectives and issues. It also saw the formation of a network of European investigators, consolidated at a week-long seminar, who will work together in producing the framework.

The phases of this process were as follows:

- *Identifying national information sources*
  The partnership identified an authoritative national source in each European country (Ministry of Education, National body responsible for Teacher Education, etc.), which helped the partnership appoint a suitable NI.
- *Supporting NI*
  Guidelines for producing national reports were sent to the identified NI. Each national report deals with ITE and CPD related to ICT for Education in the given country.
- *Writing national reports*
  The NI produced national reports and sent them to the partnership.
- *Writing a preparatory document for the Week-long Seminar*
  The partnership identified key aspects that emerged from the national reports and drafted a preliminary document to serve as a guide for discussion and comparison at the Week-long Seminar.
- *Week-long Seminar (Venice, 4th -9th October 2004)*
  The NI shared and explored national viewpoints and experiences, and identified key aspects and issues at trans-national level. This led to the definition of the structure of the framework and of the way it is to be populated. At the seminar, the outline for this book was negotiated and some of the contents were drafted (the 3 position papers contained in Section 3).
- *Cooperative production of this book*
  The NI worked together at a distance to produce this book using a CMC system.

This book is structured into three sections.
The first presents an overview of ITE and CPD pertaining to ICT in Education across Europe. This overview is based on the information provided by the national reports.
The second part draws on the national reports to sketch teachers' profile related to ICT for Education.
The third section presents the position papers produced during the Week-long Seminar.

Section 1

An overview of Initial Teacher Education and Continuing Professional Development in ICT for Education across Europe

Focusing on the European situation regarding the teacher competencies in ICT for Education that emerge from teacher training processes, the overview provides a general approach of the differences between national practices.

Specifically, the overview aims to:

- achieve a common insight into the teacher competencies in ICT for Education across Europe. This will provide a starting point for defining a shared framework for teachers' professional development, starting from the present situation;
- detect the main trends;
- learn from one another;
- share interesting ideas and approaches;
- avoid "reinventing the wheel".

The overview, based on the information provided by the National Investigators, thus draws the attention to problematic aspects that the reader will find illustrated in the nineteen national reports that follow in Section 2.

Types of teachers

In the European school systems examined in this project, several categories of teachers can be identified:

Pre-school teachers
Primary teachers
Lower secondary (upper primary) teachers
Secondary teachers
Vocational teachers
Special education teachers

The boundaries between these categories are not hard and fast. Frequently there are overlaps and, as would be expected, these vary according to the school system. For example in some countries, such as Denmark and Norway, pre-school teachers can teach in the first classes of primary school and primary teachers can teach in lower secondary school as well as in the upper classes of primary school. In Ireland the vast majority of schools are "all-through" schools, catering for pupils from 4 to 12 years of age. Usually, *Initial Teacher Education* (ITE) differs for each of the categories, while *Continuing Professional Development* (CPD) may take greater account of different mastery levels than of school levels.

ADMISSION REQUIREMENTS

In most of the cases examined, teacher education is classified as an element of higher education and entrants to teacher education courses must be in possession of the qualifications required for entry into higher education.

For pre-school and primary education, and in some cases for lower secondary, this qualification generally consists of some kind of school certificate awarded after successful completion of examinations at the end of upper secondary school.

For secondary education (in some cases restricted to upper secondary education) the entrance requirement is a university degree in the subject that is to be taught.

In some countries it is also possible to enter a primary education teaching programme after successfully completing a degree course at a university.

Some countries gauge teacher workforce requirements from year to year and on this basis set intake levels for the different types of teacher training courses. Where the number of places is limited, an entrance examination may be set. Elsewhere there is no policy of numerus clausus.

TWO MODELS OF INITIAL TEACHER EDUCATION (ITE): CONCURRENT AND CONSECUTIVE

Models of Initial Teacher Education can be allocated to one of two main categories: *concurrent* and *consecutive*. It would appear that currently a majority of primary teachers enter the profession through *concurrent courses* of three or four years' duration. This is to say that the courses consist of curriculum content as well as pedagogy and practical school experience. A much smaller number each year enter through a *consecutive* post graduate course which may last for one academic session or eighteen months. On these courses teachers in training already hold a university degree and follow courses in curriculum content and pedagogy as well as participating in practical school experience.

In some systems, where there is a division between lower and upper secondary stages, the teachers who teach in lower secondary are trained in colleges of higher education while those who are qualified to teach in upper secondary will tend to have a university degree and have followed a *consecutive course model*. In general it can be said that the position regarding primary teachers (and, where appropriate, lower secondary stage teachers) is reversed with

regard to secondary (or upper secondary) teachers. That is to say that the proportion of teachers following *consecutive* courses is greater than the proportion following *concurrent* courses. Nonetheless, in some countries it is possible to become a secondary teacher in certain subjects by taking a concurrent degree in some higher education institutions.

A variation of the consecutive model can be found in England in the form of School-Centred Initial Teacher Training (SCITT). This is a school-based post-graduate programme which empowers schools or consortia of schools accredited by the Teacher Training Agency (TTA) to provide courses of initial teacher training. Schools take the lead in designing the training programme and can choose to work with a range of partners, including higher education institutions, local education authorities and others. (England)

Pre-School Education

The pre-school teacher teaches general and social education to children aged 3 to 5 or 6 years. Pre-school education is designed to support and supplement the child's upbringing in the family and afford the child optimum opportunities for personal development and education. Children are encouraged to develop their abilities through play and other suitable activities, and to learn to live together with the rest of the group.

In Germany, children of school age (6) who have not yet attained a sufficient level of development to attend a school have a further option - the Schulkindergärten Vorclassen. These institutions are either assigned to the pre-school or the primary sector according to the particular Land. Attendance is usually voluntary, although in most Länder the authorities are entitled to make it compulsory for children of school age who are slow to develop. (Germany)

In Belgium, in special circumstances, it can be decided to keep a child for one more year at the pre-school level instead of entering primary school at the age of 6. (Belgium)

In some cases, as in Belgium and Portugal specialist courses are provided in colleges of higher education. In other instances, as for example in Denmark, England and Scotland all trainee primary teachers are given some experience in the pre-school education environment during their initial training, and part of their work in the teacher education institution is devoted to this stage. In England and Scotland it is not possible to train specifically as a nursery teacher during initial teacher education. Nursery teachers must first obtain a teaching qualification. In addition to pre-school teachers there is also the category of nursery nurse who can follow further education courses which concentrate on pre-school children and their needs. Sometimes the course for pre-school teachers incorporates initial training in Special Education.

In Ireland, there is no national system of pre-school education, but instead children start their primary schooling earlier, on average at four years of age. Hence the first two years of primary school, usually designated as Infants and Senior Infants, roughly correspond to what in many other countries is considered pre-school or nursery (aged 4-6). In this way, the majority of preschool children are educated within the primary education system and where pre-school services exist beyond this, they are largely private in nature and outside the formal education system. (Ireland)

In some istances, the initial training of pre-school teachers is provided by specialised upper secondary schools.

Primary Education

Primary school teachers teach general and social education to children aged from 5 or 6 to 11 or 12 years.

Frequently they are trained in colleges of higher education, sometimes referred to as polytechnics or, in some countries, universities, on courses of three or four years' duration following the model of *concurrent* teacher education.

In Ireland, the regulations for recognition as primary school teachers require a BEd Degree of a minimum of three years' duration. In Scotland too a BEd Degree is required but this is of four years' duration. (Ireland, Scotland)

In Greece, nursery school teachers as well as primary school teachers receive their initial training during their four years of study at the Pedagogical Departments, which have been established by almost all the Universities around the country.(Greece)

In Germany, training for primary teachers consists of a seven-semester course of study with a total of 120 aggregate hours of weekly attendance, which devotes particular attention to educational science and practical teaching components. The training incorporates study of an elective or specialised subject as well as primary school didactics. Subject options and specialisations vary from region to region. The basic educational science course incorporates general and school pedagogy as well as psychology; possible options are philosophy and sociology/political science or theology. The course of study usually includes at least one practical training period of several weeks, and should also incorporate at least one guided didactics/subject-related didactics placement. The course of studies focuses on the key academic areas of the subjects/learning areas being studied, with the aim of enabling the students to deal with complex issues and to develop a multi-disciplinary and interdisciplinary approach to their work. (Germany)

In England (as in Scotland) the content of initial teacher education courses and the minimum period of practical teaching experience are centrally specified in broad terms while the detailed organisation of courses is decided by the individual institution. In common with a number of other countries the standards to be met by the teachers in training are set out as outcome statements or competences. These cover such aspects as subject knowledge, competence in communication, in classroom methodology, in classroom management and assessment and professional values. (England, Scotland)

In some countries there also exist courses in primary education following a *consecutive model.* These courses may last from one academic year to eighteen months. In some cases the satisfactory completion of a probationary period in schools (usually of one year's duration) is required.

In Scotland, as from August 2002, all newly qualified teachers have had access to a training post for one school year immediately following qualification. The training post has a maximum class commitment of 0.7 Full Time Equivalent (FTE), with the remaining 0.3 available for professional development. Each trainee has access to a nominated induction tutor within the school to provide advice, support and guidance. (Scotland)

In England, all newly qualified teachers are required to serve an induction period of three school terms. This induction period combines an individualised programme of support

which provides opportunities for the development of knowledge, skills and achievements with an assessment of their performance.(England)

Elsewhere, as in France, there is a system of competitive examinations for teaching posts in pre-school and primary schools: the same may also apply to secondary teaching.

Since the early 1990s, initial teacher training has been organized in IUFMs (Instituts Universitaires de Formation de Maîtres - University institutes of teacher training). Candidates apply after having earned a bachelor degree and their preparation lasts two years. At the end of the first year, students sit a competitive examination, where the number of vacancies corresponds to a national forecast of teaching needs in the future years. The first year is therefore devoted to preparing for the competitive examination. Students who pass the competitive examination become "paid interns" (stagiaires) and follow a second year of professional training, teaching part time under the supervision of a mentor. At the end of the second year, they undergo an evaluation of their teaching, which is not very selective. After completing this, they become state civil servants and have tenure. (France)

Secondary Education

In most cases qualified secondary school teachers teach specific subjects to children of 11 or 12 to 17, 18 or 19 years of age. As with pre-school and primary education there is frequently a national planning exercise which limits the intake of students to the courses. It is common for teacher education courses to comprise three components – theoretical inputs from the foundation disciplines, methodology and didactic studies, and practical teaching experience. The last element of monitored teaching practice can vary in a one year course from one third to one half of the time. Courses for teachers in secondary education vary in length from one to two years.

For all teaching careers, studies at a university or equivalent institution of higher education are followed by the Vorbereitungsdienst (preparatory service) as the second stage of teacher training. These generally last 2 years and the particular focus depends on the region and the type of teaching career. They involve sitting in on lessons, guided and independent teaching at training schools, and studies in educational theory and subject-related didactics at teacher training colleges, which reappraise and consolidate experience gained through practical training. (Germany).

As university diploma and degree courses not include specific training for secondary education in their curriculum, those graduates wanting to become Secondary or Vocational teachers have to enrol in a teaching qualification course (Certificado de Aptitud Pedagógica - CAP - Teaching Proficiency Certificate) in which future teachers are trained in the pedagogical aspects of Secondary Education teaching. The structure, content and methodology of the CAP varies considerably from one institution (University or Institute of Educational Sciences) to another. In general, the core curriculum consists of both theoretical and a practical studies. The theoretical part (average time: 40 hours) contains common subject matters for all student-teachers regardless of their specialisation (General Didactics and School Management, Educational Psychology, Sociology of Education, etc.) as well as subject matters specific to their speciality (Teaching and Learning Methods for Mathematics, Language and Literature, Physics, Chemistry, Social Sciences, Music, etc).
The practical part (average time: 20 hours) takes place in public or private secondary schools under the supervision of a secondary school teacher who acts as a tutor. (Spain)

In Italy, two years of attendance at a post-graduate teachers' college, called SSIS (specialization school), are required for becoming a secondary teacher. Courses last at least two years and lead to a university diploma of the third level. There are 20 SSIS, one for each Region. To enrol in the specialisation schools SSIS, a degree university diploma is required. The number of vacancies is fixed and admittance is decided on the basis of position in a classification list. (Italy)

In Germany, training for a career in teaching general education subjects at upper secondary level or for the Gymnasium involves a course of study (first stage) generally lasting 9 semesters (occasionally 12 semesters in the case of artistic subjects) with a total of 160 aggregate hours of weekly attendance of at least two subjects (with subject-related didactics also included). The course of study is designed to incorporate all academic aspects of the subjects being studied and should develop the student's ability to tackle complex issues and to work in a multidisciplinary and interdisciplinary manner. At least one period of practical training (second stage) lasting several weeks is also required, as is at least one guided placement in didactics/subject-related didactics. (Germany)

In some countries a period of probationary practice in schools following successful completion of the teacher education course is also required.

Institutions responsible for Initial Training

Initial teacher training has traditionally been held in colleges of higher education. In recent years there has been a trend for these teacher education institutions to merge with universities and become departments or Faculties of Education.
Elsewhere, the universities have traditionally exercised academic autonomy in the nature of teacher education courses provided for secondary teachers. In these cases, as in other countries, however, the courses do need to follow certain stipulations of some central, often governmental, body. In some countries government ministers receive advice on teacher education from a general teaching council, a statutory body of which the majority of members are elected by the teaching profession.

ICT for education in ITE

Generally speaking, higher education institutions are in charge of initial teacher training and have full autonomy as far as the definition of the general curriculum and the curriculum concerning ICT in education.

In Denmark, there is no centrally issued curricular framework for ICT in initial training for teachers in primary and lower secondary education.
"Information and communication technology must be integrated in the teaching and learning so that the possibilities of the technology become an integral part of the subject in order to contribute to the development of the topics, concepts and methods of the subject. The curricula must contain rules about information and communication technology in the education […]".
Each teacher training college is free to formulate its own curriculum for the subjects: browsing the curricula of the individual colleges shows that this is done in very different ways and in various degrees of detail. As a consequence of the need for a dedicated framework for training pre-service teachers, the association of head teachers in teacher training colleges, together with UNI•C, have designed a version of the Pedagogical ICT Licence for pre-service teachers. It uses the resources of the Pedagogical ICT Licence but combines it with an alternative assessment method. (Denmark)

In some cases, governments issue general guidelines and/or standards that are to be met by curricula.

The Scottish Executive Education Department (SEED) requires that all ITE programmes reflect their ITE Benchmark standard which, with respect to ICT, expects all ITE students to be able to demonstrate the knowledge and understanding laid out in the SOEID Guidance on the use of ICT with Courses of Initial Teacher Education. Thus all Scottish ITE programmes have ICT provision built into them, and this focuses principally on the pedagogical uses of ICT. (Scotland)

In The Netherlands, from 1999 until 2004 the Dutch government encouraged the teacher training institutes (responsible for developing the teacher training curriculum) to change their educational framework by subsidizing plans concerning the development of nine specific innovation goals. The 3rd innovation objective was "to integrate ICT in the educational programmes of the institutes". The 6th innovation objective was "to establish a common set of standards in professional competencies".

Compentencies	with pupils	with colleagues	within the environment	with themselves
interpersonal	taking care of a good relational atmosphere in the classroom	taking care of a coherent curriculum in co-operation with other colleagues	tuning their own actions with the people outside the school: parents, institutes	reflective and developing professionally
pedagogical	providing a safe learning environment			
subject orientated & didactical	providing a powerful learning environment			
organisational	providing an orderly and task oriented atmosphere			

These are very general descriptions and leave a lot of space for individual teacher educators and teacher training institutes to offer a curriculum where these competencies (among others) are being developed. Nevertheless as these descriptions will become obligatory by law before the end of 2004, they are directive for both initial and in-service teacher training. (The Netherlands)

There is a wide-ranging national framework of aims to keep in mind when the ITE is realised. How the programme is carried out at the different universities is up to local decision-making. Concerning ICT, the framework states that students should be able to use information technology in pedagogical development and appreciate the importance of the role of the mass media in this. Thus students have a basket of selective courses. Some of these courses have themes relating to ICT. (Sweden)

In some countries, an appointed central body defines contents regarding new technology for initial teacher training.

The curriculum framework of ICT for education in initial teacher training is managed by the centralised Committee of Departmental Didactics (Rada oborovỳch didaktiků).(Czech Republic)

In ITE three main ICT skill areas can be identified:
Basic skills in the use of ICT
ICT in a curriculum area
ICT in teacher's pratice
These are each described below.

BASIC SKILLS IN THE USE OF ICT
Initial teacher training in ICT for education can vary considerably depending on the higher education institution that is in charge of it. One important factor institutions must take into account is that increasingly boys and girls start using ICT before entering higher secondary education. Often they acquire ICT skills either at school (primary or secondary) or autonomously, independent of their education path.

> *From the late 1980s, according to requirements of the Hungarian National Curriculum, ICT has been taught as a compulsory discipline for students aged 13-18 in one weekly period. Therefore, younger teachers have entered the profession with profound basic skills and middle-aged colleagues in all schools can rely on support from the ICT specialist and his / her student assistants. (Hungary)*

In the near future, basic ICT skills are likely to be considered as a prerequisite in higher education. Indeed, some institutions are already regarding such competences as necessary for attending higher education and evaluate them with specially devised entrance tests.

> *ICT training is designed as a two-stage system, i.e. 1st stage – basic user skills, 2nd stage – pedagogical use. 1st stage – Each student is required to pass a test in ICT (Course in ICT) in the first phase of his/her studies. Successful completion of the ICT course is a prerequisite for all ICT oriented courses. (Czech Republic)*

Since the situation is often quite heterogeneous, some institutions are offering (mandatory or optional) courses for developing basic ICT skills. Given that students may possess different levels of skills, these courses are offered at different levels.

> *Students may – but are not required to – study basic ICT use in optional introductory courses. As more and more students come to college with high level ICT competencies gained in primary and secondary school, these courses are offered at different levels. Advanced ICT education in colleges involves the adaptation and even design of simple educational software with the help of editing systems and the use of digital content databases. (Hungary)*

Courses of this kind deal with the ability to use the PC and the Internet as tools for:
- Improving individual productivity (i.e. WPs, spreadsheets, databases, software for developing presentations, graphic and photo editors, etc.);
- Accessing information (i.e. browsers, search engines, bulletin boards, etc.);
- Producing and publishing information on the web (web page editors);
- Communicating (i.e. e-mail, chat, etc.).

> *Students' ICT skills after secondary school are not sufficient. In most cases a new course "ICT" was introduced based on self-learning. The ECDL was widely adopted as guidance for the goals of the course. At the same time, all other courses tried to embed ICT.*

ICT for primary and secondary school teachers- Students develop their skills through self-learning and demonstrate the skills through the completion of tasks. In addition to the ECDL, multimedia skills and knowledge of simple authoring software (like Hot Potatoes) is required. The primary goal of the "ICT-course" is that students have a thorough mastery of ICT themselves. It is expected that students can use e-mail, can search on the Internet, and can use a word-processor to complete tasks, do preparation and compile reports during their studies. (Belgium)

In some countries, institutions offer on-line courses and/or labs sessions based on ICT. Through such courses trainees acquire a certain implicit knowledge concerning both the technology on which they are based (CMC systems, e-learning platforms, etc.) and the processes of on-line communication and collaboration.

Iceland University of Education and the Educational Department of Akureyri graduate teachers through a distance learning program. Students in distance education generally complete most of their courses independently using computer technology and the Internet. All distance education programs, however, also include some on-campus activities. More than half of the students at the Iceland University of Education are enrolled in distance education programs. The universities offer elective courses in ICT for the distance initial teacher trainees at the beginning of their studies. The students learn how to use the computer, computer programs and how to use a distance learning environment and closed courseware like WebCT. The same ICT courses are offered to on-campus students and in the distance programmes. Most courses both in the distance program and on-campus have their own websites. (Iceland)

Those who have acquired some basic ICT skills may be able to use them systematically within their everyday practice, but unfortunately this does not mean that they are able to use them effectively in the classroom. In order to develop the specific competences needed to do so, institutions all over Europe are following two main kinds of approach: tackling the use of new technology for supporting learning process within specific subject areas, or, alternatively, dealing with aspects of educational technology and in particular with methods and tools for designing and using ICT-based learning environments.

ICT IN A CURRICULUM AREA

Within the courses concerning ICT in a curriculum area, basic ICT skills are considered as a prerequisite and special attention is devoted to three main elements:

Use of educational software for a given subject. This approach is particularly common in mathematics, where tools such as Cabri Geometre, Derive, etc. are studied. Nevertheless, the use of educational software is not only restricted to scientific subjects, but also involve areas of humanities and arts (i.e. writing, historical models, history of art, etc.) and second language.

As far as Physics is concerned, many simulation software programs are available. In some courses the computer is connected to sensors and used in the lab for gathering data that are then elaborated online, so as to provide an immediate representation of the observed phenomena. (Italy)

General upper secondary education paedagogikum has defined a set of ICT competencies that must be covered during pedagogical training. The competencies derive from the Pedagogical ICT Licence for in-service teachers in upper secondary education and are

divided into two groups: general ICT pedagogy and subject-specific ICT pedagogy. The guidelines for paedagogikum are realised as open, flexible learning (areas: Internet in education, Project based learning and ICT, subject-relevant ICT application). (Denmark)

Use of tools for individual productivity within a given subject, such as the use of word processors in linguistic courses for improving students' writing skills, databases in History and Geography, spreadsheets within different scientific subjects, etc.
Use of professional tools within a given subject: the use of professional software is tackled especially in teacher training programs for vocational education. This is the case of CAD software or bookkeeping software, which are an integral part of the professional subject syllabi.

The infusion of ICT in the different curricula is rather variable. The amount of teacher training in ICT is strictly correlated to the integration of ICT instruments in the subject matters teachers will have to teach and to the correlative presence (or absence) of ICT in the corresponding syllabi. This integration is thus complete in the different technical subjects (e.g. using 3D modelling software for mechanical engineering, using databases in management studies, etc.). There is also, at junior secondary level, a special course named "technologie", which has special responsibility for the education of students regarding information technology, and is therefore a subject where student teachers receive special training in ICT. Sciences also currently use computer aided experimentation in lab work and also use digital data (e.g. in the field of biology). To some extent, in mathematics spreadsheets and algebra systems are used, as well as software like Cabri geometre in geometry. All these classes of software are present to some extent in the disciplinary dimension of initial teacher training. But there is no fixed curriculum. (France)

ICT IN TEACHERS' PRACTICE

Most of the initiatives deal with the use of ICT in learning processes independent of the contents. Contents can vary widely, depending both on the type of teachers (primary, secondary, etc.) and on the underlying learning models; they may deal with:

- the use of software for improving presentations (PowerPoint, etc.);
- the use of Internet for retrieving materials for students;
- methods for designing and implementing learning environments, including activities to be carried out by students based on specific strategies and tools; etc.

Some courses mainly deal with *theoretical aspects*, such as *learning theories*, *learning strategies underlying educational software*, etc.; others focus on *implementation aspects*, i.e. development of learning materials or websites.

In the latest framework for teacher education issued by the Ministry of Research and Education (3rd April 2003), "ICT should be an interdisciplinary tool for communication and learning". Student teachers should have competence to use [new] technology in learning and communication, but they should also be able to reflection critically on its use". Each University College defines its own curriculum […] University Colleges involved in the PLUTO (Programme for Teacher Education, Technology and Change) deal with innovative and comprehensive restructuring of teacher education. (Norway)

ICT training for teachers has been included in the programme in almost all teacher education programmes. Programmes are usually evaluated as part of the teacher

education programme. Evaluation methods vary, and include practical ICT tasks, production of a portfolio of ICT related materials, evidence of use of ICT in the classroom, and theoretical examinations exploring student understanding of the potential of ICT in education. As to the pedagogical change mentioned in the ICT programmes, care is taken to present some scenarios close to the current reality of schools, so that student teachers can see some immediate uses for the technology.
Students complete ICT projects at intervals throughout the year. Students taking the optional higher level course produce a portfolio of ICT resources, usually websites and multimedia presentations, designed to model the kinds of tasks they could encourage students to take on as projects. (Ireland)

The objectives for the ICT specialization is to educate teachers who are competent users of ICT and are able to organize and perform school tasks and integrate ICT with other school subjects. The courses offered are:
- *Information technology and school work: technological competency, technical literacy and ICT in schools.*
- *Learning environment: possibilities of the web in distributed and flexible learning and teaching is studied.*
- *The knowledge-society: education, learning and schools in the information society. Students evaluate e.g. educational computer programs and computer games and webs for children..*
- *Production of educational material and media: ICT use and multimedia technology. Students learn to use tools for handling pictures and sound to make educational material. (Iceland).*

Educational technology is a compulsory discipline at all universities and ICT is a significant part of the programmes. The course lasts one semester and a term paper (often a digital or paper-based or film-based teaching aid or presentation) is required. Generally, curricula are divided between "traditional" and "new" educational tools and the latter involve the following topics, taught in about 50 % of total course time:
- *Computer use for education, communication and school management*
- *Word processing: production of tests and other teaching aids*
- *Production of presentations and other illustrative materials*
- *Using communication and management platforms*
- *Educational software assessment and use*
- *Digital image production and processing*
- *Digital photography (at some institutions, also film making)*
- *Image processing (scanning, texting, sound, altering/combining images, etc.). (Hungary)*

Some initiatives also focus on other aspects typical of teacher practice, i.e. the role of ICT for teacher-personality, the social role of teachers, the role of ICT in organisation, innovation and school development.

In general, teachers must feel safe with computers and other relevant technologies, in order to use IT in their own instruction. Learning how to utilise IT independently always contains two phases: one has to learn to use the technical tools reasonably fluently and, on the other hand, to learn to envisage how one's own tasks can be carried out better and more easily using these new tools. The programme on Media education (organised by the University of Helsinki, department for teacher education) focuses on the theoretical and

practical significance of media education in the various fields of society and its different applications in teaching, studies, work, communication and in general in versatile information management. (Finland)

As to the Integration of ICT into the curriculum, five benchmarks are defined for comparing teacher training curricula with respect to ICT:
- benchmark 1 *Personal ICT competencies*
  handling office applications, resource tools, communication tools
- benchmark 2 *ICT as a mind tool*
  using ICT for co-operation between teachers, students and collaboration on pedagogical projects
- benchmark 3 *Educational / pedagogical use of ICT*
  using ICT in both asynchronous and synchronous learning environments
- benchmark 4 *ICT as a tool for teaching*
  for better teaching, planning learning activities, preparing learning materials and special ICT-subjects
- benchmark 5 *Social aspects of ICT use in education*
  be models of good ICT practice, realise impact ICT on society. (The Netherlands)

A curricular framework exists for both phases of initial teacher training, which is entitled: "Future of learning – learning for the future: New Media in initial teacher training" (Ministry of Education and Science, Düsseldorf 2000).
The central aims for both phases are:
- *to act competently with ICT*
- *to understand the role of ICT in the socialisation of children*
- *to use ICT as educational technology*
- *to use ICT for administration and school development*
- *to analyse the personal, organisational and institutional conditions for effective use of ICT and to take part in the development of a school policy for ICT. (Germany)*

One or more autonomous mandatory courses in educational technology are offered to all aspirant secondary teachers. The curricula of such courses involves:
- *learning theories supporting school innovation based on ICT (constructivism, social constructivism, cognitive apprenticeship, situated learning, etc.);*
- *learning models and methods supporting learning processes based on these theories (learning communities, cooperative learning, project based learning, peer learning, etc.);*
- *learning environments supporting these models and processes (microworlds, virtual communities, etc.);*
- *ICT (tools and methods supporting these environments: editors, word processors, hypertext editors, CAD systems, CMC systems, graphic editors, music editors, etc.);*
- *Instructional design related to the development and management of learning environments;*
- *School innovation issues (the teacher's new role, organisational issues, etc.). (Italy)*

Approaches of Continuing Professional Development (CPD)

In some countries, teachers' professional development is a natural continuation of initial training and consequently it is managed by the same institutions, pursues the same objectives and adopts the same criteria.

The municipalities as employers of teachers have full responsibility for CPD. As many of the course elements in the ITE are selective for the students, they can at the same time function as single subject courses for in service training. The municipalities purchase such courses from the universities, as well as non-credit courses from private educational companies and regional development centres. (Sweden)

In other countries, there seems to be no continuity between initial teacher training and continuing professional development.
Although there are a few cases in which CPD is mandatory, it usually isn't. In some countries CPD courses lead to an increase in teachers' salary or to better professional opportunities.

All teachers in Hungary have to undergo 120 lesson hours of in-service training (taking a few long or several short courses that add up to this figure) once every seven years. Major accredited course providers are:
- *Hungarian Schoolnet (www.sulinet.hu), which offers basic and advanced discipline based training related in part to its international activities (co-operation with European Schoolnet, the ICT Expert Group of the European Union and OECD research projects.);*
- *ISZE (Association of Teachers of IT, www.isze.hu);*
- *Universities and colleges;*
- *Private training companies and infrastructure providers. (Hungary)*

Progression to and through the chartered teacher status right up to head teacher is now to be by qualification. To obtain promotion it will be necessary for teachers to complete successfully a number of modular courses of continuing professional development. (Scotland)

The governments of all European countries share the awareness that teachers' professional development in ICT for education is a key factor in school innovation. However, they have adopted different approaches to the question, ranging from very *decentralised* and *autonomous initiatives* to very *structured systems.*

DECENTRALISED INITIATIVES
Public or certified private bodies autonomously propose courses in ICT for education addressed to in-service teachers.

Institutions for tertiary education are involved in the development of in-service training courses. Regional expertise networks were developed in 2000. These expertise networks are intended for all kinds of co-operation, with the essential task being to provide in-service training. Besides that, the networks are expected to use their expertise for technical and organisational support. (Belgium)

In-service teacher training at regional level is conducted differently in each region by the institutes for in-service teacher training and their branches and by middle- and lower-level school supervisory authorities. Lower-level school supervisory authorities (Schulämter) are usually responsible for the organisation of in-service training at local level. (Germany)

Since 1st January 1991, the municipalities have had full responsibility as employers for teachers and under the Education Act are obliged to ensure that competence development is arranged for the teaching staff.

The state shall by means of the funds made available to the National Agency for Education steer activities towards nationally important areas, taking into account that it is the principal organiser of the school that has the responsibility for implementing competence development. (Sweden)

CENTRALISED SYSTEMS

In some countries CPD is completely organized and managed at a national level by a single central body.

The Ministry of Education is in charge of designing and implementing teacher training policy. For this purpose the following organisations have been established:
- *Hellenic Pedagogical Institute, which was established in 1964 and among others is responsible for the auditing of the Regional Teacher Training Centres.*
- *The National Teacher Training Organisation established in 2002 is responsible for national policy and designing process as far as teacher training is concerned. (Greece)*

COMBINED APPROACHES

In some approaches centralised and decentralised aspects are merged together and this can occur with different levels of intensity. In some countries governments define guidelines and standards in order to give orientation for the decentralized institutions, which remain autonomy in managing CPD; in others there exist syllabi with associated courses and/or management systems which are very centrally controlled.

- *Set of standards or guidelines.* The governments define a set of standards or guidelines, while public or private institutions design and offer ICT courses based on these standards.

Revised guidance entitled Staff Development and Review Guidelines and Checklist was distributed to all local authorities in 1998 by the SOEID (now SEED), and in line with these Guidelines, a new national framework of competencies, standards and associated for the Continuing Professional Development (CPD) of teachers has been devised. Under the terms of the agreement on the McCrone Committee recommendations, a total of 35 hours of continuing professional development (CPD) per annum has been introduced as a maximum for all teachers. The time is to be spent on an appropriate balance of personal professional development, attendance at nationally accredited courses, small scale school - based activities or other CPD activity, the balance to be determined following an assessment of the individual teacher's needs and taking into account school, local authority and national priorities.
A number of different bodies are involved in providing staff development at national, education authority and school levels, but the main bodies are the education authorities, the schools themselves, often with the help of outside support, and the teacher education institutions. (Scotland)

The actions of professional development have been decentralized since the beginning of the nineteen eighties. Continuing education of first and second degree teachers is organised respectively by the departments and the academies. At the national level, a national training plan (PNF) mainly aims at defining priorities and at training trainers at the other levels. The offer of training (included in the three year contracts académies have with the national level) varies according to the académies, even if all actions make reference to national orientations. (France)

- *Pedagogical licence and associated courses:* an ICT pedagogical syllabus is assumed as a basis for a national policy and a set of given courses based on this syllabus is offered to teachers. Usually a coordination body manages the system at a central level.

  The Ministry of Education has supported the development of a series of Pedagogical ICT Licences (in operation since 1999) for the in-service training of teachers in the pedagogical implementation of ICT, as a pedagogical alternative to the ECDL. There is a total of 9 Pedagogical ICT Licences each targeting a specific group of in-service teachers. It is a course concept that offers teachers basic ICT skills focusing on the pedagogical integration of ICT in teaching practice.
  Several characteristics of the Pedagogical ICT Licence are that:
  - *Participants work with ICT skills related to themes.*
  - *Participants work in teams where teachers develop material and learning scenarios together for use in their own daily praxis*
  - *Many teachers from the same school participate simultaneously.*
  - *Module elements are: pedagogical content, ICT skills exercises, ICT manuals, supplementary articles. (Denmark)*

  The national Norwegian programme "LærerIKT" (Teacher ICT) launched in 2001, is an effort focusing on competence building in the educational use of ICT and digital literacy. The Ministry of Research and Education has commissioned the LærerIKT continuous education programme. The main goals for LærerIKT are to inspire teachers to start using ICT both in their own teaching, and as an administrative tool in their work. The participants should learn how ICT can be used as a tool in their day-to-day tasks at school, and further develop their own ICT skills. The work will be in groups of colleagues, and the participants will have guidance from a more skilled teacher who normally works in a school similar to that of the participant. Both teachers from primary and secondary (lower and upper) can enrol in the programme. (Norway)

Sometimes, within these combined approaches, the two elements (*set of standards* and *pedagogical licence*) coexist.

"The 6th innovation objective was to establish standards of professional competencies. […] they are directive for both initial and in-service teacher training. As a result of the sixth innovation goal, a framework of standard competencies for teachers has recently been developed, together with experts and the teaching community.". Before the end of 2004 the standard competencies for teachers will be prescribed by the government. At a more detailed level an initiative has been developed in the Netherlands called the Digital Drivers Licence of Education ("DRO"). The first set of objectives of the so called Digital Drivers Licence of Education ("DRO") consisted of 5 areas of attainment targets. At this very moment the DRO comprises five modules (1. Handling the computer, 2. Word-processing, 3. Information and communication, 4. Processing data and presentation, 5. ICT in education). The last module consists of 81 assessment points in 7 areas of educational application:
5.1 Personal use of ICT
5.2 Using ICT with and by children
5.3 Using ICT in the school
5.4 Didactics of ICT
5.5 Digital learning materials
5.6 ICT and organisation
5.7 Educational Digital Learning Environments

This set of objectives has been derived from the International Computer Drivers Licence (ICDL), but amplified with special educational and pedagogical objectives. For this DRO, teachers can follow courses and get a diploma. By achieving this diploma a teacher meets the requirements of the standard competencies. (The Netherlands)

Continuing education and training have been divided into the following forms on the basis of the bodies responsible for decision making:
- *Self-motivated continuing teacher education. Teachers have the responsibility and power of decision for participating in education and they may receive support from society in the form of various study grants.*
- *In-service training at educational institutions, which is the responsibility of the maintaining body of the institution. The maintaining bodies also receive state support for training costs within the framework of state subsidy.*
- *Education that is important in terms of education policy. The Ministry of Education drew up a development programme for teacher training in 2001. The programme lists current and important topics: developing the use of ICT in education, subject and field-specific knowledge and skills, special needs pedagogy, […] as well as developing management skills and schools as work communities.*

To date, most continuing teacher education has been short-term training to maintain professional skills […]. In the future, teacher education will most likely be based on a more individual learning programme. Studies can thus be constructed on the basis of individual career plans and teachers can flexibly supplement their studies at a later stage. (Finland)

Furthermore, in some situations, independent of the adopted approach, governments launch *temporary plans* aimed at improving the professional development of great numbers of in-service teachers in the field of ICT.
Plans usually address different teacher populations, according to their mastery level. Syllabus, materials and learning strategies are centrally determined, while use is often decentralised.

March 2001, in the context of the European Action Plan e-Europe the Austrian Ministry for Education launched a helpful national plan for in-service teacher training in ICT :
- *INTEL-Lehren*
- *ELearning-Projects and eLearning-Cluster*
- *EContent-development*
- *etc.*

Many in-service training establishments work with e-learning platforms. Integration of national IT strategies into national educational objectives is still on going. "IT/e-learning as main part of the school development and quality assurance", new didactic methods, new learning culture, e-learning in laptop classes, e-learning cluster at the school level, change in teaching and the teacher's role on the international and regional level are discussed and implemented in different ways. (Austria)

The Minister for Education in 1997 launched the initiative "Schools IT 2000: a policy framework for the New Millennium". This was reflective of a new concern to promote the use of ICT within the school system. The National Council for Technology in Education (NCTE) was set up to spearhead the drive, in liaison with the Department of Education and Science. Universities, colleges, private companies, Education Centres have all been proactive in providing in-service training in ICT to very large numbers of teachers.

The incorporation of ICT in teaching, learning and administration of schools has been a significant government concern: significant investment has been made in equipping schools for ICT purposes, and a range of short, medium and long-term in-service training courses have been made available to teachers by a variety of providers. (Ireland)

In May 2002, in the context of the National Actions for the Information Society (March 2001) (the Italian action in the European Action Plan e-Europe - Lisbon 2000) the Italian Ministry for Education (MIUR) launched a nation-wide plan for in-service teacher training in ICT (http://www.istruzione.it/ innovazione/progetti/tic.shtml).
The project is articulated into three levels:

1. *Basic uses of computer in the classroom and in school organisation (mainly addressed to ICT novices) (160,000 teachers)*
2. *Uses of ICT for learning, school organisation and consulting (mainly devoted to pioneer teachers) (13,550 teachers)*
3. *Uses of ICT to develop and manage the school technological infrastructure (mainly devoted to teachers who are in charge of the school infrastructure) (4,500 teachers). (Italy)*

In 1998 the Government also presented a major programme for developing the competence of teachers within the ICT area – ICT in school, ITiS. Between 1999 and 2002, more than 70,000 teachers, corresponding to half of all teachers, were offered training in using computers as a professional and pedagogical tool. The training took place in work teams. Teachers participating in the training and qualifying for an IT certificate received a modern multimedia computer in their home for work purposes.
The programme for ICT in the school, which also covered programmes for pupils, was implemented by a Delegation appointed by the Government. This was made up of representatives from the Ministry of Education and Science, the National Agency for Education and the Swedish Association of Local Authorities and the teacher unions. (Sweden)

ICT for education in Continuing Professional Development

The process of identifying the focuses of CPD regarding ICT in education is far more complex than for ITE and depends on both the type of approach and the organizational structure adopted. In many countries it is not possible to identify a framework of reference, and it is also quite difficult to find common characteristics underlying the different training initiatives.
On the contrary, in those countries which have adopted a centralised approach or at least where a national plan exists, contents are clearly identified and identifiable. In such situations, CPD may offer various initiatives covering different levels of competences. Those initiatives can be classified according to the contents and abilities addressed:

1. *using ICT effectively;*
2. *using ICT in the classroom;*
3. *facing problems arising in the knowledge society within everyday practice.*

In those countries where ICT are less widespread, courses focus mainly on the first topic, while in other countries courses combine "Using ICT effectively" and "Using ICT in the classroom". The third topic, for which topic 1) and 2) are prerequisites, is now gaining ground and is typical of countries where ICT use is more widespread.

USING ICT EFFECTIVELY (COMPUTER DRIVING LICENCE)

Usually courses can vary a lot both on length and contents, depending on participants'

skill level. Several courses adopt ECDL (European Computer Driving Licence) as a reference, other assume adapted versions of ECDL; the rest of the courses emphasize competencies of higher order, which can be reinforced by the use of technology (communication skills, capabilities of searching and evaluating information, etc.). At a lower level, courses focus on technical aspects and on the use of tools such as Office suites (WP, spreadsheets, PowerPoint). At a more advanced level, some courses tackle issues such as web page production, or - in broad terms - the production of multimedia materials to be published on the web. Very advanced technical courses do exist as well, concerning capabilities to administer computer networks or systems as a support for both school management and learning.

The technology drive extends far beyond the provision of equipment and technical aids. Approx. 120 comprehensive projects have been implemented since 2001 in the area of information technologies and e-learning, ranging from area experiments in "pupils' notebook classes" to the generation of electronic learning contents by teachers (eContent project) or the use of learning platforms. From a pedagogical angle, school development plays an important auxiliary role. It is implemented as a school development process. The electronic integration of all school sites was successfully completed; the broad-based training of teachers in IT skills is still in process (e.g. passing the ECDL), but has proved successful in terms of national coverage. (Austria)

ICT education is designed primarily for teachers in the pre-primary, primary, secondary and special needs schools.
The structure of ICT education: ICT education is a four-level system
Z ... basic user knowledge
P ... training for advanced users
S ... training focused on special skills/knowledge
N ... training for school computer network administrators – ICT coordinators
"Z" type training is designed for beginners, who have no experience using ICT. The main objectives of the training are to motivate teachers to use computers at home as well as in schools, and to provide them with basic user skills and knowledge in the area of ICT. Teachers are trained to use PCs for personal, daily use (operation systems, Networks, Text editors, E-mail, Internet search). (Czech Republic)

LærerIKT is a web-based in-service education initiative, available for all teachers in primary, lower and upper secondary school. The course is aimed at all teachers regardless of their level of computer skills. LærerIKT has regional organisers all over Norway. The programme is based on different modules. There are 5 compulsory modules and 9 voluntary modules, of which the participant has to choose 2.
The compulsory modules are: Internet, Communication, Word processing, Spreadsheet, Images)
The voluntary modules are: Presentation, Sound, Multimedia, Internet publishing/Internet sites, Portfolio, Differentiated education, Library/Resources/Search, Computer Games, Story line). (Norway)

USING ICT IN THE CLASSROOM (PEDAGOGICAL ICT LICENCE)

Under this heading we can list those initiatives that deal with the use of computer and Internet within the classroom. As in ITE, a dualism exists between the use of the computer within a specific curriculum area and the use of ICT for improving learning at a general level. Nevertheless, boundaries between the two kinds of application are less clear than in ITE. In some countries national syllabi exist, on which courses for CPD are based (*Pedagogical*

licences). In others, the situation is quite de-structured and the institutions running the CPD are also in charge of defining contents.
In both cases, the pedagogical approaches underlying the training initiatives can vary a lot. At one extreme we find approaches that essentially follow the transmissive model, but improve its main elements (lectures, exercises, tests, information retrieval, etc.).
At the opposite end, we find the use of ICT for the development and management of learning environments that are fundamentally different from traditional ones, in that they are based on constructivist and socio-constructivist models.

Programme Nonio has participated in a European project (PICTTE – Profiles in ICT for Teacher Training) that has tried to define a profile in ICT and a basic curriculum for teacher training, as follows:
Teacher Profile in ICT
Attitudes Technological Innovation
Opening to technology
Technology Acceptance
Adaptability/Role change
Learner centeredness
Learner responsibility
Teacher as service provider
Openness to student participation
Mediation
Communication facilitator (Portugal)

The recently completed NOF (New Opportunities Fund) project provided ICT training for all serving teachers in Scotland, employing the five point ICT curriculum framework laid out in Guidance on the use of ICT with Courses of Initial Teacher Education (1999):
- *working effectively with ICT in Teaching and Learning;*
- *evaluating and selecting ICT resources;*
- *monitoring, evaluating and assessing teaching and learning;*
- *developing ICT capabilities identifying ICT skills and knowledge needs of pupils and themselves;*
- *technical skills and applications knowing about, and using, a range of hardware and software for a range of information, learning and communications tasks; knowing about the ethical, legal and health and safety implications of using ICT. (Scotland)*

Nevertheless, the majority of the initiatives can be placed somewhere in the middle of the two extremes because they share characteristics of the two.

The Pedagogical ICT Licence Course material inspires and offers ideas on how to teach about and with ICT. Participants work in teams where teachers develop material and learning scenarios together for use in their own daily praxis. The course objectives are: General knowledge of ICT and learning; Media competencies.
The content areas are: General use of the computer, file management, security, etc.; Search and communication using the Internet; Electronic communication; Word processing; Layout; Digital images; Presentations; The production of web pages; Spreadsheets; Internal databases; Using learning resources; ICT and working methods; Computer games in teaching and learning. (Denmark)
The Teaching Skills Initiatives (TSI), one of the core element of the "Schools IT 2000" programme, brought to the development of a complete ICT skills programme to ensure

teacher progression from novice to expert (some course currently on offer are i.e. Digital Media; the Internet & Email for Learning; Empowering Minds - Programmable Bricks; ICT and Special Needs; ICT and the Primary Curriculum; ICT in Mathematics; etc.).
A notable in-service training programme in ICT were:
- the School Integration Project (SIP), a schools project to lead to the identification of policy, training and support models, pedagogical strategies and classroom resources for ICT adoption in Irish schools (a core group of 40 schools to be involved in piloting various models of ICT integration) and
- ScoilNet, a web site to publish Schools IT 2000 advice sheets, guidelines and curriculum materials to assist ICT integration in the classroom. ScoilNet support staff to provide expert advice to schools via e-mail. Curriculum materials to be developed in partnership with educational organisations and teacher groups. Curriculum resources produced by ScoilNet to be made available to every school. (Ireland)

The curriculum of the National Plan was structured into the following three modules:
Module 1: Training in generic ICT skills
Module 2: Training in the use of ICT in subject teaching
Module 3: Design and production of educational activities, lesson plans and scenarios concerning ICT exploitation in the classroom. (Greece)

FACING PROBLEMS OF THE KNOWLEDGE SOCIETY

The knowledge society calls for profound innovation of the school system, involving all its elements (structures, organization, people, contents, methods, resources, etc.). Teachers play a key role in the process of innovation and their professional development must take into account the challenges and the problems arising in our society.
Teachers' professional profile must definitely include new technology seen as a tool for improving his/her individual productivity and his/her communication and interaction abilities. Indeed it must include the ability to create and use suitable learning environments able to facilitate the learning process, as well as the ability to use ICT in every aspect of teacher practice. From this point of view, The Netherlands offers an interesting model, containing 4 fields in which new technologies can be involved for improving teacher practice: teacher/pupils relationship; teacher/colleague relationship; teacher/environment relationship and teacher/self relationship (cfr. p. 21).
This way of conceiving the impact of ICT on teacher practice is now starting to emerge in the more advanced CPD contexts and may constitute the starting point for the definition of a common European framework for teacher's professional profile in ICT.

In addition to important technical and pedagogical modules, ethical and social points of view also need to be included. Training arrangements in the professional development of teachers in particular must acknowledge that, as regards the educational use of ICT, institutional development is a communal learning process.
The government has funded a program to improve the educational ICT skills of all teachers. The training is organised into three levels of competencies:
- *basic skills, […] covers the basic mastering of ICT tools. It is extremely important for the equal standards in teaching and for personal use of ICT in education;*
- *use of ICT in education skills […] training in this phase addresses the different needs of education along with the deepening and diversification of pedagogical use;*
- *and advanced ICT skills […] covers the advance use of ICT in school and in broader contexts. […] The educational use of ICT in institutional development is a communal learning process and requires broad participation in training with colleagues. (Finland)*

There is a wide variety of ways in-service teacher training on ICT is carried out. Generally, content areas involved in Teachers' Competencies Profile In ICT for Education pertains to:

- *the role of technology in supporting innovation in education;*
- *the digital portfolio;*
- *administrative applications;*
- *national support;*
- *community-building;*
- *the role of educational publishers. (The Netherlands)*

Ways of accomplishing ITE and CPD

PRE-SERVICE TEACHER TRAINING

Technological development has been yielding an outstanding change in ways of learning in the context of ITE and CPD.

Many higher education institutes, departments of teacher education or vocational teacher education institutes have started to use collaborative teaching/learning environments and e-learning platforms to deliver on-line courses, lectures and learning materials.

There are SSIS which deliver blended courses on ICT for education. In these courses face to face lessons are delivered by the lecturer while online lessons are entrusted to the tutor, who proposes individual and collaborative activities to the students and supports them in exam preparation. The activities are organised in modules of one or two weeks, staggered with classroom lessons. In some cases the online and in presence learning actions are closely connected and harmonized, in other cases there is a weak link between F2F lectures and online activities. (Italy)

There are 22 University Colleges that offer teacher education in Norway. Each University college defines its own subject syllabus, and some have a stronger emphasis on ICT than others. The 5 University Colleges involved in the PLUTO program in particular have focused strongly on ICT in teacher education. The University College of Vestfold (HiVE) has embedded ICT as a part of teacher education. "All trainee teachers have their own laptop, and ICT is used as a tool in teaching, student work and as a communication tool. There will be great emphasis on student-active learning processes and project based work". HiVE also uses the digital portfolio as a tool for students to organise their work, and as a tool for student assessment. (Norway)

The Finnish Virtual University supports a project called KasVi (The National Virtual University Project of the Faculties of Education of Eight Finnish Universities) The overall objective of KasVi is to find new innovative and virtual modes of co-operation in the field of teacher education and information and communication technologies. (Finland)

In accordance with a schedule typical of the blended-learning methodology, the first phase is often conducted face to face, for example a two-week stay in a campus, followed by a distance learning mode, i.e. blog-sites (web-log) or videoconferences.

In the Iceland University of Education the norm for distance learning for primary schools student teachers is now as follows: two weeks on campus at the beginning of each semester (August and January) and then the rest of the time teaching and learning via the Internet. A web course is set up either with a closed courseware like WebCT or open websites. This is sometimes used both for distance and on campus students. The system is

similar to those in other universities, where, however, videoconferencing is used to send out lectures. A few teachers have tried using open blog-sites (web-logs) on the web for that purpose. This can also be looked upon as enhancing the feeling of being part of a learning community as you can follow your fellow students´ learning logs. (Iceland)

Some departments (NTUA, UoA, UoM etc) provide sophisticated videoconferencing classrooms, which they use for teaching purposes. (Greece)

During pre-service training, on-line courses use:
- e-learning platforms, (for example Moodle, BSCW, Blackboard, WebCT);
- e-mail, mailing lists, chats or forums to communicate at a distance;
- internet resources to share vocational training experiences;
- virtual laboratories;
- media examples;
- multimedia presentations.

Moreover, teachers, as well as availing themselves of on-line materials, can increase their own productivity, developing further abilities using new technologies of which they will make use within their classrooms.

In Portugal, a pedagogical use of ICT approach for teacher training has been defended by the main actors involved in this issue. Several workshops/on-line training initiatives for ICT teacher trainers were promoted by Programme Nonio in 2001-2002 to discuss a basic curriculum for teacher training and a set of materials were developed to support this curriculum. These materials took the shape of training manuals with practical examples of the integration of ICT tools in the classroom. These materials were disseminated to the teacher training centres around the country. (Portugal)

IN-SERVICE TEACHER TRAINING

In the majority of the European countries, learning environments for in-service teacher training include computer laboratories, blended-learning courses, collaborative laboratories assisted by an on-line tutor.

University, academic and master level courses are being structured along the same lines as the traditional F2F model, but are also being combined with distance training activities.

ICT is used as a supporting tool for communication and collaboration among teachers, for sending e-mails, joining in forums, chatting, as well as for teaching activities during their apprenticeship.

In virtual environments, the tutor plays a key role in chairing forums, coordinating laboratory activities and rating teacher outputs/elaborations for final assessment. These are real lessons where a tutor supports a teacher for the whole course period.

In this particular context, communication may be synchronous or asynchronous: i.e. with network connection even if only for downloading course materials, sharing a 'video space' or further chatting with participants at the virtual lesson. Major benefits spring from their developing abilities in accomplishing new interaction approaches, which are more dynamic and flexible.

The State Institute for School supports all ISTT projects with the educational server and with bscw platforms, and it has just started to qualify tutors for online-learning. (Germany)

LærerIKT is based on process-oriented writing, where dialogue and collaboration within

the group and with the tutor are seen as crucial factors. The group first writes a draft for the assignment and sends this to their tutor, who makes comments. Based on the tutors' comments the group edits and re-writes their assignment. The final assignment is then sent to the tutor for approval. (Norway)

Initiatives A, B and C described in previous sections are structured according to a blended model based on a low level of interaction among participants.
Each module lasts 12 hours: 6 hours are F2F and are coordinated by a tutor; 6 hours are online. (Italy)

Blended–learning initiatives involve:

- courses and workshops;
- seminars;
- team work.

Team work is organized within small teacher groups with a view to boosting collaboration. Groups are made up of between three-four and eight people, who compare their points of view/positions and produce materials to be shared afterwards with other teachers.

LærerIKT starts with a regional 6-hour get-together where participants are introduced to the contents of the course and receive a binder. The participants are divided into groups of between 3 and 4 persons (preferably from the same school), who will cooperate on the module assignments.
At the initial get-together, participants are introduced to the learning platform and the National School Net. Participants also receive a binder containing the 5 common modules and have access to the closed section of the web site. In addition to the contents of the binder, the closed web site comprises key instructions and links to learning resources. At the get-together they also meet up with their tutor. (Norway)

Working Groups: Made up of 3 to 8, or even more, people who share a common interest for a topic readily applicable to their daily work with students. The group meets for a whole academic year on regular basis and usually achieves the objective of developing and implementing at classroom level ICT-based teaching and learning materials. They also produce useful reflections and conclusions regarding their work which can be highly useful for other teachers. These groups, which are self-managed, are increasingly making use of Internet for exchanging their product and enhancing their communication. (Spain)

Section 2

Countries situation

Drawing on guidelines produced by the uTeacher partnership, each National Investigator wrote a report on the situation in his/her country concerning teachers' profile in ICT for Education underlying Initial Teacher Education (ITE) and Continuing Professional Development (CPD). Each national report is structured according to a number of major issues.

Initial and in-service teacher training: objectives, subject areas and bodies
setting out the objectives and the areas of such training processes related to all the aspects of teachers' practice involving ICT (pedagogical uses of ICT in the classroom, the use of ICT for improving school organisation, ICT in professional development, ICT for improving personal productivity, etc.).

*Curricular framework of ICT for education in teacher training (*both in initial and in-service training)
describing the explicit or implicit curricular framework of teacher training initiatives, mainly addressing the uses of ICT in the context of:
- the classroom, to improve students' learning;
- the teachers' community, to improve their cooperation;
- school organisation, to improve school effectiveness;
- teachers' professional development, to extend learning opportunities.

How teacher training is carried out (both in initial and in-service training)
explaining the ways in which initial and in-service training are accomplished: using ICT tools or not, working online or not, working collaboratively or not, etc.

Teachers actual competencies and tasks in using ICT
reporting studies or statistical surveys concerning actual teacher uses of ICT in education.

Problems that teachers face in using ICT in their practice
reporting studies or statistical surveys concerning problems faced by teachers in using ICT in education (e.g. lack of access to computers and a data projector, lack of educational materials at school, lack of knowledge in using computers, etc.).

Content areas involved in teachers' competence profile in ICT for education
listing broad topics related to teachers' competence in ICT for education. These topics have been drawn from major national teacher training initiatives from initial training courses, or from NIs experience as experts involved in the field.

Initial teacher training: objectives, subject areas and institutional courses

Kindergarten teachers complete five years of training from the age of 14 onwards or a two-year post-secondary course. Primary and lower secondary school teachers must have completed a three-year course at a teacher training college. Teachers in an *allgemein bildende höhere Schule* (academic secondary school) must complete a university course of at least four-and-a-half years leading to a degree. Depending on their subject area, teachers for the TVE sector are trained either at universities or teacher training colleges. For technical theory and practice, relevant professional experience is required.

Primary school teachers do not specialize, whereas lower and upper secondary school teachers specialize in two subjects. Teachers are employed at either federal or provincial level (civil servants). With regard to initial training, a differentiation is to be made between *Kindergarten* (nursery school), *Allgemeinbildende Pflichtschulen* (general compulsory school), *Berufsschulen* (part-time compulsory vocational school), medium and higher-level secondary schools, and higher education. For some subjects at medium and higher-level secondary schools there are special training courses not included in the traditional pathways.

Hubert Egger
PIB – bmbwk

Hubert Egger works at the Pedagogical Institute in Feldkirch/ Vorarlberg/Austria teaching mathematics, physics and ICT in upper secondary school; elearning-coordinator and project-manager for the 'ILIAS open source learning management system' in Vorarlberg/Austria.

Institutions for compulsory-school teachers *Pädagogischen Akademien* (training institute for general compulsory school teachers) were established on the basis of the School Acts of 1962 and replaced the teacher-training institutions that had been organised at secondary school level.

The training of primary school teachers, initially two years, was extended in 1985 to three years, giving all study courses at *Pädagogischen Akademien* a uniform length of three years and making them consistent with the European Community concept of higher education (non-university tertiary educational institution). It is envisaged to further develop the *Pädagogische Akademien* into universities for educational professions by the year 2007. The universities to be set up will cover teacher training as well as adult education and other educational tasks. These study programmes will entail academic qualifications. Teachers for the *Allgemeinbildende höhere Schulen* (academic secondary school) and for general-education subjects at technical and vocational schools and colleges *Berufsbildenden mittleren Schulen* (medium-level vocational schools) and *Berufsbildenden höheren Schulen* (higher-level vocational schools) are trained at universities and arts universities.

PRE-PRIMARY EDUCATION (*Vorschulerziehung*)

Kindergarten teachers are either trained in special schools at upper secondary level or in special training colleges at post-secondary level. The latter provide a two-year teacher training course that is also open to individuals who may not have passed a school-leaving examination but have worked in related occupational fields. The latter have to pass a special entrance examination or vocational school-leaving examination. These colleges constitute a major reform in the kindergarten sector.

PRIMARY EDUCATION (*Volksschule*)

Teachers for the pre-primary year and primary school and teachers in special schools are trained at tertiary level teacher training colleges (*Pädagogische Akademien*). Candidates for teacher training colleges must have passed their matriculation examination, or must have passed a special entrance examination (*Studienberechtigungsprüfung*) or vocational matriculation examination (*Berufsreifeprüfung*).

The training course lasts at least six semesters (three years) and is completed by a teaching qualification examination. Prospective primary school teachers generally acquire the whole range of skills necessary for teaching subjects in primary school (except Religious Instruction) and pre-primary education.

Primary school teachers are provincial employees (i.e. civil servants) under either a private-law or a public-law contract (tenured service). Part-time employment is possible. Teachers receive continuing training either through autonomous study or by attending training establishments. However, only 15 hours of such training per year are compulsory. In-service training activities can be attended either during the holidays, in the teacher's free time or during working hours.

GENERAL SECONDARY SCHOOL (*Hauptschule*)

General secondary and pre-vocational school teachers, such as primary and special school teachers, follow tertiary level training at Teacher Training Colleges. The training course lasts at least six semesters (three years) and ends with a teaching diploma examination.

Teachers for general secondary and prevocational schools are qualified in at least two subjects (subject teacher system). They teach their subjects in various classes and, provided that it is one of the ability group subjects, in various ability groups. In general secondary school, teachers often teach their subjects to the same class for all four years, although changes may be necessary for various reasons (e.g. maternity leave). From a pedagogical point of view, continuity is recommended.

ACADEMIC SECONDARY SCHOOL - LOWER LEVEL (*Allgemeinbildende höhere Schule, AHS - Unterstufe*) AND ACADEMIC SECONDARY SCHOOL - UPPER LEVEL (*Allgemeinbildende höhere Schule, AHS - Oberstufe*)

Teachers at academic secondary schools are trained at universities or fine arts universities. Courses for qualifying as a teacher are defined as diploma studies. They last nine semesters (four-and-a-half years). Students must pass two diploma examinations and submit a diploma paper in order to graduate with an academic degree (Magister). Studies include academic training in two subjects, pedagogical training in the last five semesters, and a *Schulpraktikum* comprising a four-week introductory phase and eight weeks of teaching practice. The Magister diploma does not automatically entitle candidates to a permanent teaching post. Prior to being permanently employed, graduates have to successfully complete both a year of teaching in a school and additional courses (*Unterrichtspraktikum*). Teachers at academic secondary schools are federal employees, under either a private-law contract or a public-law contract (tenured service). Part-time employment is possible.

At upper secondary level the differentiation in the school system becomes more marked due to the more clearly discernible interests and talents of pupils, as well as the requirements of society for different forms of vocational qualifications. Besides academic secondary schools, years 9 to 13 (14- to 19-year-olds) are also provided in secondary technical and vocational schools. The upper level of secondary education therefore comprises the following school types:

- pre-vocational school;

- upper level of academic secondary school (years 9 to 12);
- vocational school (years 10 to 13 maximum) – parallel to in-company vocational training ('dual system');
- intermediate technical and vocational schools (years 9 to 12 maximum);
- higher technical and vocational schools (years 9 to 13);
- Kindergarten Teacher Training College (years 9 to 13);
- Training College for Non-Teaching Supervisory Staff (years 9 to 13).

Teachers at intermediate or upper secondary technical and vocational schools are subject area specialists. The nature of training courses and admission requirements depend on the subjects to be taught. The training of teachers of general subjects in intermediate and higher technical and vocational schools is the same as that of academic secondary school teachers. Teachers of theoretical subjects in higher vocational schools must have professional experience in the relevant area in addition to university training. Special training is provided for teachers of practical subjects and teachers of theoretical subjects in intermediate vocational secondary schools (e.g. in vocational teacher training schools and teacher training schools).

Initial teacher training: curricular framework of ICT for education

ICT FOR PRE-SCHOOL TEACHERS

General course structure: 5 years (general education plus teaching-specific subjects). The theoretical part is provided in school, the practical part takes place in Kindergarten. At the end of the course, students take an upper secondary final examination (*Reifeprüfung*) and a *Befähigungsprüfung*. The post-secondary Training Course (*Kolleg*) takes 4 semesters (2 years) with emphasis on the professional aspects. The topic "ICT for education" is not specifically addressed. ICT-Skills are partly trained in specific courses.

ICT FOR PRIMARY-SCHOOL TEACHERS

General course structure: 3 years (at least 6 semesters): it comprises a total of 168 weekly units of tuition (approx. 2500 hours of lectures, seminars and work in small groups). Competence is required in all subjects taught in primary school. The course comprises the following areas of study:

- Human sciences (*Humanwissenschaften*): e.g. education sciences, theory of teaching and learning, educational psychology, educational sociology, special education (about 25% of the total course time).
- Subjects taught at primary and pre-school level (47% of the course time).
- Teaching practice (18% of the total course time) (weekly lessons in demonstration schools).
- The remaining time is devoted to acquiring additional skills necessary to be a professional teacher. It is also possible to acquire additional qualifications (e.g. alternative education, multicultural education).

The comprehensive educational mandate of the *Grundschule* aims at individually fostering each and every child. It is to take account of pupils' individual needs and educability, and to initiate a process of continuous learning. In doing so, the *Grundschule* is to lay the basis for a successful learning experience in secondary education.

Usage of adequate Computersoftware and Online-Offers for supplementary education is implemented in different subjects and courses.

ICT FOR SECONDARY-SCHOOL TEACHERS

a) General Lower Secondary School

General course structure: 3 years (at least 6 semesters). Teachers specialize in 2 subjects. The first subject must be German or English or Mathematics, but the second subject may be chosen freely from the whole range of subjects taught in these schools. The time devoted to education sciences in the course for Primary teachers is given over to studies in the various subjects in the course for lower secondary teachers. In each subject, student teachers receive a total of 28-30 hours of tuition a week in these subjects (approx. 420-450 hours) plus a total of 8-10 hours of tuition each week in subject matter methodology (*Fachdidaktik*) - approx. 120-150 hours in all.

b) General Secondary School Allgemeinbildende höhere Schulen

General course structure: 2-phase model.

Phase 1. A minimum of 9 semesters or 4 years. General academic background necessary for teaching at lower and upper secondary level. Students normally specialize in 2 subjects. The first part of the course concentrates on subject studies. The remaining 5 semesters comprise subject matter methodology, studies in the educational sciences and period of teaching practice. On average, about 84% of the total of 160 hours is devoted to subject studies, 10% to subject matter methodology and 6% to educational studies and teaching practice.

Phase 2. An additional year of practical teaching in schools (*Unterrichtspraktikum*). Parallel to this, student teachers must attend obligatory courses organized by the Pedagogical Institutes (non-university institutes of in-service training).

In matter methodology ICT is integrated in autonomous courses. ICT Basic Courses are offered to all aspirant teachers. ICT technologies are embedded in courses related to a given curriculum area (maths, language, etc). The focus is how ICT can enhance the understanding of a specific area. Educational software and conditions for using it in the classroom are described, trialed and relevant web sites for each areas are studied.

Educational software for the specific subject (Derive, CAS-Systems, drill and practice software in languages, sensor-control-systems and connection to the computer, simulation-software, etc.) is implemented in specific courses.

How initial teacher training is carried out

Systematic data at national level is not available. In generally, a subset of ECDL-Skills is trained. Many institutions are beginning to use e-Learning-Platform (ILIAS, Blackboard, WebCT) to deliver online-materials and to work collaboratively. This differs from the studied subject and varies from region to region. There are also many teachers leaving initial training without implementing ICT-knowledge in their school lessons. Online-investigation and text-retrieval is implemented as standard method. If there is access to an online environment students can retrieve learning material, evaluation tests and participate in a forum to communicate with their tutor and colleagues and also to perform tasks.

In-service teacher training: objectives, subject areas and bodies

The *Schulorganisationsgesetz* (School Organisation Act) of 1962 provided for the establishment of in-service training institutions in analogy to the existing *Pädagogische Institut* (further training institute for teachers) at *Allgemeinbildende Pflichtschulen* (general compulsory schools). In 1966, the first Vocational Teacher Training Institute (*Berufspädagogisches Institut* - BPI) for the in-service training of teachers at technical and vocational schools was founded in Vienna. From 1968/69 onwards, the BPI held all in-

service training activities organised to that date by the Ministry of Education. The activities were organised at national and at regional level. Soon, Styria and the Tyrol had their own BPIs. In 1970 a department within the newly founded teachers' division in the Ministry of Education took over the agenda of initial and further training of teachers. In subsequent years BPIs were established in the other provinces. In some provinces they were associated to the *Pädagogische Institute*. In the 5th Amendment of the School Organisation Act in-service training institutions for teachers were elevated to the rank of *Akademien*.

Since 1977, these institutions have i.e. also been responsible for initial teacher training for technical theory (since 1980 also for law teachers), since 1978 for that of vocational school teachers and teachers of practical training.

In the 7th Amendment to the School Organisation Act (1983) in-service training of teachers was restructured. The BPIs were integrated into the *Pädagogischen Institute* as "Department of teachers at *Berufsschulen* (part-time compulsory vocational school)" and "Department of teachers at technical and vocational schools and colleges".

Teachers in Austria have the legal obligation of keeping their knowledge at an up-to-date level. While INSET/ further training is thus compulsory, the laws do not stipulate its nature or frequency. Teachers do not have to attend courses if they prefer to study on their own. As a rule, seminar participation is voluntary. If vital school-related innovations occur, further training courses may be compulsory.

Since 2001, all teachers subject to the Province Teacher Service Code are obliged to attend 15 hours of INSET activities. The programmes are usually designed for certain target groups (teachers of one school type or of one specific subject), but sometimes interdisciplinary courses are offered that are open to all teachers.

The aim of in-service training courses in Austria is to support teachers' professional development and to enhance their knowledge and skills in the relevant subject matter, methodology, legal and organizational matters and classroom management, and to contribute to the development of the teaching profession.

The provision of in-service training for teachers is governed by the School Organization Act (*Schulorganisationsgesetz*). The present organizational structure of in-service training has been laid down in amendment 7 (part V, *Pädagogische Institute*).

In accordance with the School Organization Act, in-service training is provided in institutions for the in-service and further training of teachers (*Pädagogische Institute*) which have been established in all nine *Bundesländer* in Austria. Most are federal institutions, but some are run privately by the provinces and are recognised as public institutions. Like the teacher training colleges for primary and lower secondary school teachers (*Pädagogische Akademien*) they are establishments of higher education.

The *Pädagogische Institute* are organized in four departments, reflecting the different school categories:

- for teachers in primary and lower secondary schools;
- for teachers in vocational colleges for apprentices (part-time);
- for teachers in general secondary schools (for 10- to 18-year-olds);
- for teachers in technical and vocational colleges (full-time).

The responsibilities of the *Pädagogische Institute* include both in-service training courses aimed at teachers' professional development and "further training courses" with special curricula leading to examinations which confer additional qualifications and entitle those concerned to teach specific or newly introduced subjects.

They also provide initial training for university graduates in general education subjects and staff recruited from industry and business. They also carry out educational research. One of the principal tasks of the *Pädagogische Institute* is to plan, organize and run in-

service training courses at local and regional level, including school-based courses. The **Pädagogische Institute** are under the control of the regional education authorities which are, in turn, suppervised by the Federal Ministry of Education. The regional education authorities co-ordinate the programmes at regional level, while it is the Ministry undertakes co-ordination of training at inter-regional and national level which is, in turn, organized and run by the *Pädagogische Institute*.
As well as the *Pädagogische Institute*, there are separate institutions for teachers of Religious Instruction and those working in the agricultural sector. A variety of other kinds of bodies (universities, teachers' associations, political parties, churches and the chambers of commerce) also provide in-service and further training courses.

RIGHT TO IN-SERVICE TRAINING

Teachers are legally obliged to ensure that their knowledge and teaching content are kept up to date. Thus, in-service training may be considered mandatory, although there is no law or directive indicating either the type or the frequency of in-service training courses to be attended. Teachers cannot be forced to accept any of the programmes offered if they prefer private study. Enrolment is normally on a voluntary basis. When important innovations are introduced, however, in-service training can be made compulsory.
Whilst teachers are following in-service training courses they are replaced either by the head teacher or by a colleague teaching in the school.

QUALIFYING TRAINING AND EVALUATION

Teachers who attend in-service courses receive only certificates of attendance.
There is no bonus for attending a training course nor any immediate effects on teachers' salaries or careers. However, when there is a vacancy (e.g. for a head of department or head teacher), priority may be given to the candidates with the highest attendance rates. On the other hand, teachers successful in courses of further training receive certificates or diplomas, which in certain cases, entitle them not only to teach another or an additional subject or to take on certain responsibilities but also to progress up the salary scale.
Evaluation of the organization and content of the training is carried out at the end of every course by means of questionnaires to be completed by the participants. Teachers undergoing training are not assessed on a systematic basis. It is assumed that they will benefit from the training and be able to make use of their newly acquired skills in the classroom.

IN-SERVICE TRAINING ESTABLISHMENTS AND TRAINERS

Through the educational research which they conduct and co-operation with other institutions, the *Pädagogische Institute* have extensive knowledge and wide experience of educational trends and problems. They also have a legal obligation to co-operate with other institutions, including universities and adult education institutes, private bodies and industry. Trainers can thus be recruited from amongst teachers and from these institutions. They are usually engaged for individual courses, so considerable flexibility is guaranteed, which often makes it possible to react to short-term needs. Due to awareness of the importance of trainer quality, several measures have been taken to improve the training of teacher trainers recruited from the peer group.

FORM AND CONTENT

In-service training is mostly provided during the academic year and teachers are granted leave to attend. A certain number of courses also take place during the school holidays. There is a decree limiting short courses during the school year to a maximum of three consecutive days in order to contain costs. This is a counterweight to the special regulations which allow a

paid supply teacher to be provided when a teacher's absence exceeds three days. However, this decree includes specific provision for the length of training to be extended where necessary. Courses organized in modules or as weekly meetings outside teaching hours can run over a term or a year or even longer. Teachers who undertake in-company training are entitled to special leave which may sometimes be assimilated to sabbatical leave under COMETT programme, as these training periods usually exceed one week.

In-service training is extremely varied both in form and content. It can be organized in the form of workshops, seminars with lectures and discussions, conferences, field trips, industrial visits, in-company (on-the-job) training etc. Other types of activities include meetings or workshops for teachers of specific subjects (*Arbeitsgemeinschaften*).

The programmes are usually limited to specific target groups (categories of teachers or teachers in specific types of school or subjects) but there are also courses open to all teachers. Specific selection criteria may be applied, depending on the course content.

The content of in-service training is extremely varied, ranging from topics connected with the organization of education, to curricular matters, via topics of regional importance and the science of education, which is a particular favourite. Areas such as school management, computer studies, teacher development and classroom management, the new technologies, EU actions and multicultural education are becoming increasingly popular. Provision has also been made in order to meet unforeseen needs in any field (e.g. migrants' children) at short notice. Once Austria has access to all EU exchange programmes, training activities will certainly be integrated into international programmes to a greater extent. At present, Austria has bilateral programmes with other European countries, including these of Eastern Europe, which enable their teachers to attend courses in Austria or to take courses appropriate to their needs given in their home countries by Austrian trainers. As a member of the Council of Europe, Austria takes part in the CDCC Teacher Bursaries Scheme. Under this scheme, Austria admits 50 teachers from other member countries to its short national in-service training courses as part of the in-service training programme for teachers of the technical and vocational education sectors.

In exchange, Austrian teachers can take part in courses offered by other countries and by the Council of Europe. Since 1992, Austria has participated in the COMETT programme and is preparing to set up the necessary infrastructure to take part in the LINGUA programme.

Participation rates in in-service training vary in particular according to the different categories of teachers and subjects. Needs analysis during the planning stage, a combination of both top-down and bottom-up approaches and flexibility in course organization allow programmes to be adapted to teachers' needs.

The Ministry allocates 0,5% of its budget to in-service teacher training. This is equivalent to 18,5% of expenditure on initial training.

REFORMS / CURRENT DEBATES AND TRENDS

Efforts to introduce compulsory teacher training (for instance attendance at one course a year) have failed, partly because of the high costs which would be involved.

Subjects covered by in-service training programmes follow changes in society and in education and educational reform. Thus, since the recently introduced reforms (14th and 15th amendments to the School Organization Act) granting a higher degree of autonomy to schools and providing for the integration of handicapped children into mainstream schools, courses have been offered to teachers and heads to enable them to carry out their new tasks. Main current trends and priorities include teacher development, school management, new technologies, multicultural education, teaching of German as a foreign language, foreign language teaching (especially vocationally-oriented language learning),

in-company training for teachers of technological and commercial subjects, ecological awareness, adult education, interdisciplinary skills, core skills, and the European dimension.

In-service teacher training: curricular framework of ICT for education

March 2001, in the context of the European Action Plan e-Europe (and Feira 1999) the Austrian Ministry for Education (bmbwk) launched a helpful national plan for in-service teacher training in ICT:

- INTEL-Lehren (http://www.intel-lehren.net)
- ELearning-Projects and eLearning-Cluster (http://www.schule.at)
- EContent-development (http://www.virtuelleschule.at)
- etc.

Many in-service training establishments work with eLearning-platforms (e.g. http://elearning.vobs.at).

Integration of national IT strategies into national educational objectives is still going on. "IT/e-learning as main part of the school development and quality assurance", new didactic methods, new learning culture, e-learning in laptop classes, e-learning cluster on the school level, change in teaching and the teacher's role on the international and regional level are discussed and implemented in different ways.

There are many new IT services for the educational organisations and institutions, for example: National Clearing House for eContent, Databases for eContent/e-learning resources - CONTAKE, CELEBRATE, eServices for schools and universities (educational server http://www.bildung.at), eContent initiative: copyright questions in practice, eContent Cluster Austria, architectur and access management.

Copyright of Software, laptop classrooms, ECDL – European Computer Driving Licence, EBDL – European Business Driving Licence, IT certificate, IT teacher training, continued education online and business cooperations are main fields in ICT for education in Austria. (Source: http://www.virtuelleschule.at/bildungskonferenz2004/it_arbeitsunterlagen_07_mai_2004_eng.doc).

How in-service teacher training is carried out

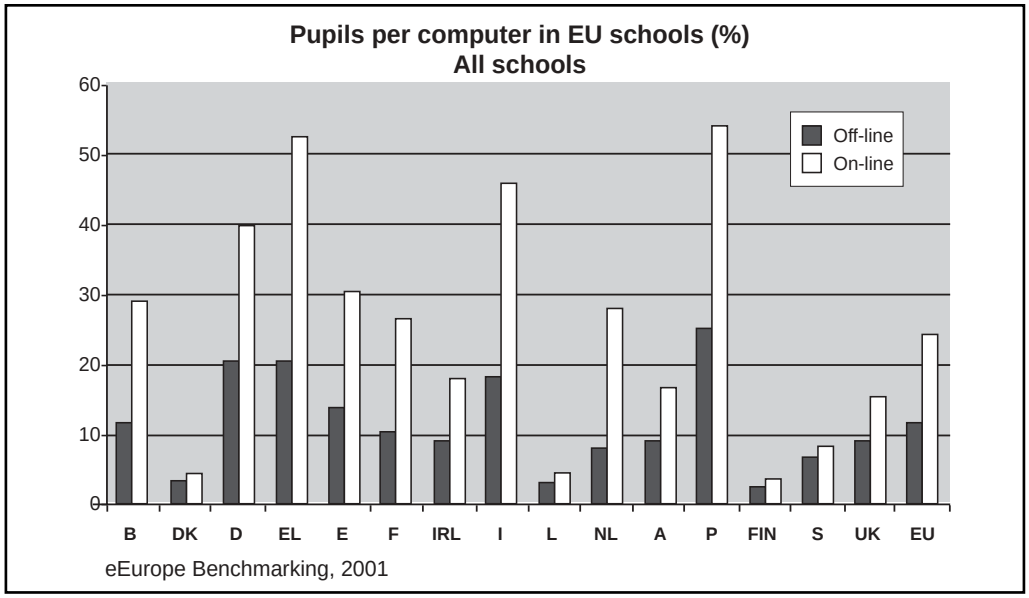
Every in-service teacher training institution is equipped with computer labs, but not all courses are held there. Despite this, nearly no training is carried out without a short work online. Teacher expect to get information and skills concerning ICT in their subject matter in order to take advantage of it in their lessons and courses.

In service teacher training is also carried out in the local schools of the teachers. Therefore these schools are equipped with ICT-infrastructure. If a teacher learned how to work with ICT in one school network, he is able to train the pupils on every other school. As a first level support, there is a special teacher called 'IT-Kustos' in every school. Second level support is delivered from outside, mainly from a regional, special trained group of teachers.

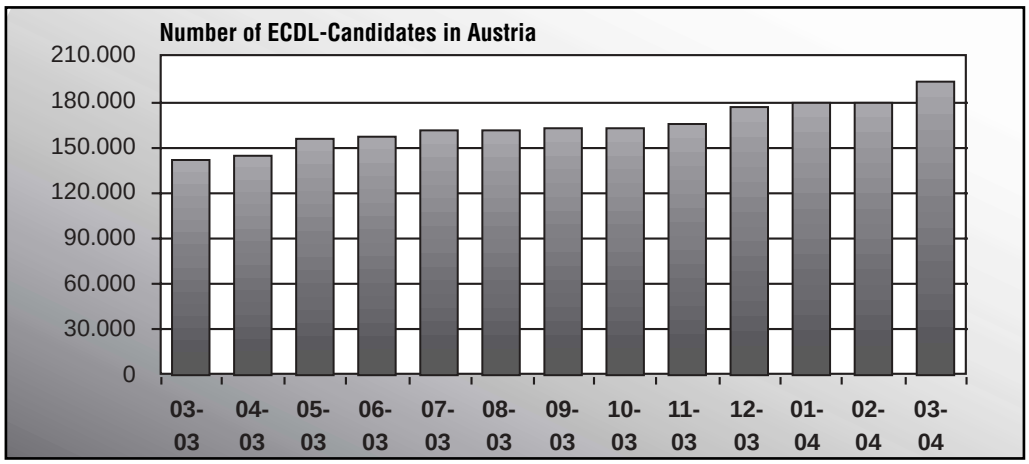
In every of the nine *Bundesländer* (regions) of Austria, it is usual to offer a elearning-platform to organize in-service teacher training courses. The offer of online courses and eContent for specialist training is growing.

Working collaboratively on elearning-platforms and working with methods like 'blended learning' is forced. Many projects from the Austrian Ministry of Education (bmbwk) support these efforts and ICT-infrastructures. (Source: http://www.schule.at; http://www.bildung.at).

Teachers actual competencies and tasks in using ICT



Systematic data at national level is not available. This year, about 10 per cent of the students complete their studies with additional qualification papers like ECDL (http://www.ocg.at/; http://www.ecdl.at/ecdl.html).



About 80 per cent of the teacher own a PC, but in school, only about 50 per cent of them start using it. (http://www.stangl-taller.at/INTERNETSCHULE/NEWS/news9912.html).

Problems that teachers face in using ICT in their practice

Following problems should be solved in the next years.

A widely spread internet connection from 2 to 10 Mbit/sec (in order to work comfortably with the internet and with notebook classrooms).

Accommodation and periodical modernisation of classroom-PCs. At the time, there is mostly new equipment in the teaching labs at school. Some curriculum have to be adapted. In secondary school a minimum standard of ICT-Skills should be implemented. It is still possible to pass through the mandatory education line without acquiring some basic ICT-skills. Every teacher should be able to use the learned ICT-skills for his courses without fear. In order to stay motivated, the rarely teacher-salary in Austria should be raised.
In the year 2004, there is much possibility to access computers, but in many leading schools (own curriculum with various focal points) the need for more ICT-labs arise. As a result of this – beneath the financial support from the bmbwk – many laptop-classes were founded.
It is more often shown, that work at computer and ICT-skills are formed to the fourth cultural technique beneath arithmetic, writing and reading. Every primary and secondary school should have working-access to the internet.
Most of the secondary schools are having this possibility, but many teacher still don't work adequately. As a standard working tool for educational purposes elearning-platforms (see http://www.ilias.uni-koeln.de) should be regionally supported and updated regularly. Many teachers and schools want to organize their courses with the help of these education tools: there is a great call for LMS (Learning Management System), CMS (Content Management System) and LCMS in the daily work of school.
The lack of data projectors in training rooms is still evident although the special rooms like PC-labs, physic-labs, etc. are equipped with it. The better the ICT-infrastructure and the handling of it in schools is, the more likely a also unmotivated teacher will switch over.
Continuous and periodical courses at the teachers local school concerning ICT-Skills and didactics of subject should be available on a greater amount.
Many young teachers do not give lessons with what they have learned to do. F2F-teaching without working collaboratively and without ICT-basis are still existing.
In many regional school administrative branches people are not able to give the affordable support for ICT-projects, they even don't value teacher activities in ICT.
Lack of educational materials is met with the so called eContent-initiative of the bmbwk. Teachers are encouraged to produce and sale eContent for their lessons. There is still not enough didactically adapted educational material besides the fact that schoolbook publishers try to offer some. Extension of libraries concerning multimedia and streaming video for educational purposes is highly recommended and necessary.

Content areas involved in teachers' competencies profile in ICT for education

CONTENT AREA
http://www.e-teaching-austria.at
http://www.schule.at; http://www.bildung.at
http://www.lehrer.at/neu/links/elearning/sa/
http://elearning.vobs.at
http://www.virtuelleschule.at http://www.virtuelleschule.at/vis061102_econtent_datenbanken_suche.htm
http://www.klassezukunft.at
http://www.esffubb.at/
http://ikt1014.egger.ac
http://www.schulinformatik.at
http://www.blended-elearning.at/
http://community.schule.at/index.php?design=&cid=1212&folder=4268&modul=0
http://community.schule.at; http://www.eduhui.at

ONGOING DEVELOPMENTS AND TOPICS OF DEBATE IN EDUCATION IN AUSTRIA

1) Topics of debate and developments in school education

Managing the lifetimes of young people responsibly

It is an aim of educational policy to reduce the workload of Austrian pupils which is above the OECD average. The syllabus needs to be revised with a view to quantitative changes in classroom instruction and the new challenges which are placed e.g. by the new media. A moderate reduction of mandatory hours is to result in a focus on core areas. Pupils are to select add-on or complementary fields of study according to their individual needs. This reduced workload does not only create scope for extra-mural activities, but also time to practice and consolidate what was learned. Highly gifted pupils may access university prematurely. As of year 11, they may sit for examinations which are credited towards later studies.

Enhancing the quality of education

by consolidating scholastic output with the help of reliable, modern learning and teaching methods and performance standards; further development of school profiles and school programmes; creation of quality assurance mechanisms for school education ("PISA National"). An Internet platform which is widely accepted by the schools has been installed for that purpose (see: www.qis.at).

A future commission composed of renowned educational experts has been set up which is to provide advice in the implementation of measures. Moreover, the *klasse:zukunft project* was launched. Involving the future commission, this initiative is to develop quality promotion measures at Austrian schools. It uses the open planning approach and includes all school partners and groups in school education. The virtual future platform (www.klassezukunft.at), through which anybody interested may contribute proposals and opinions via the Internet, is an essential tool.

White book

Quality development and quality assurance at Austrian schools.

Consistent with international trends, Austria, is experiencing a shift of focus from central input control to process, and above all, output control. This logically results in fundamental changes of the self-concept of the controlling levels. Ready-made concepts which govern every detail are replaced by a new governance philosophy which builds on framework requirements, performance agreements, participation and transparency. The white book is a reflection of this trend. It embarks on novel approaches both in operational terms, as well as in terms of the process of public opinion formation. The white book provides summary information on current ideas for quality development and quality assurance in the Austrian system of education. It is to stimulate a broad-based debate on how to assure continuity whilst advancing reforms.
(http://www.bmbwk.gv.at/start.asp?bereich=3&OID=10091).

Curriculum for secondary academic schools

The curricula which entered into force on 1st September 2000 (secondary general schools and secondary academic schools) provide for a scheme of core and add-on contents to deal with themes that are relevant at a particular school site. A curriculum for the upper cycle of secondary academic schools has been drafted.

First-rate teachers for first-rate education

by transforming (non-university) teacher training colleges (*Pädagogische Akademien*) into *Pädagogische Hochschulen* (university level) and evaluating the initial and in-service education options for teachers. Redistribution of teachers' salaries for the benefit of young teachers and review of the allowance system in the light of stronger performance orientation. The OECD Country Surveys support the developments in this area as well

as on issues such as pre-school education; transition from school to the world of work; adult education; life and career counselling as well as funding of the educational system.

Optimising school administration

by a clear-cut separation of strategic and operative responsibilities, further expansion of school autonomy and decentralisation. Reviewing the political bodies of the province and district school boards and those areas of school policy in which a parliamentary two thirds majority makes sense.

Continuation of the technology drive

The technology drive extends far beyond the provision of equipment and technical aids. Approx. 120 comprehensive projects are being implemented since 2001 in the area of information technologies and e-learning, ranging from area experiments on "pupils notebook classes" to the generation of electronic learning contents by teachers (eContent project) or the use of learning platforms. From a pedagogical angle, school development plays an important auxiliary role. It is implemented as a school development process. The electronic integration of all school sites was successfully completed; the broad-based training of teachers in IT skills is still in process (e.g. passing the ECDL), but shows good success in terms of national coverage.

eFit Austria Initiative

The extensive eFit Austria Initiative specifically supports and promotes the best possible and sustainable use of modern information and communication technologies with a wide impact in education, science and culture.

eFit Austria covers areas such eEducation, eScience and eTraining (http://www.efit.at).

2) Higher Education Reforms - University reform

The 1999 amendment to the University Education Act (*Universitäts-Studiengesetz*) introduced the three-tier system of universities studies, excluding teacher training, human medicine and dental medicine studies, which are only offered as diploma programmes. In the mid-range, diploma studies will generally be replaced by baccalaureate and Magister study programmes. In 2002, 106 baccalaureate and 123 Magister study programmes already existed. The 2002 University Education Act cedes almost all legal competencies to the universities, which are now accountable for their own programmes, whilst having to comply with EU directives, if applicable. The shift from semester hours to a point-based system according to the European Credit Transfer System promotes national and international student mobility.

Organisational reform

The 2002 Universities Act which entered into force in October 2002 and will be fully implemented on 1st January 2004, gives full legal status to universities. Newly recruited university staff will henceforth be employed under private law contracts. Universities will be funded via a global budget which is set up for three-year periods based on outputs and outcomes. The services rendered by the Federal Ministry and the university are laid down by way of negotiation in so called "performance agreements". The role of the Ministry is limited to legal supervision, i.e. verifying compliance with laws and regulations. The University Council is charged with the majority of supervisory functions. It is a body of the university which examines the financial management of the rectorate and exercises shared decision-making powers in fundamental strategic decisions. The top management is completed by a senate, which is designed as the academic counterweight to the University Council and has a right of co-determination in final decisions on study matters. The Universities Act also created three new medical universities.

Accreditation

A law on the accreditation of private universities has been in force since 1999. Post-secondary studies and private educational establishments of a quasi-university character may be officially recognised as private universities. For this purpose, an independent Accreditation Council was set up in the year 2000 which is composed of European university experts. So far, 6 private universities have been accredited. Universities are accredited for a maximum period of 5 years. Re-accreditation requires re-application before expiry. The Accreditation Council is moreover responsible for ensuring continuous and concomitant quality control of the accredited private universities.

Fachhochschulen

Since 2002, *Fachhochschule* study programmes may be run as tree-tier programmes. The time input required for studies is defined by ECTS points. Increasing use is being made of distance study elements. The range of subjects studied at *Fachhochschulen* has been extended to include the social and health professions. Training at the *Sozialakademien* (post-secondary colleges for social work) is being phased out. Another aim is the stronger integration of the health professions in the *Fachhochschule* sector, in the training of which the Länder have been strongly involved up to now.

INFORMATION SHEET OF AUSTRIA

	Typology of teacher	Educational level	Model of teacher training	Duration	National standard
INITIAL TEACHER TRAINING SYSTEM	*Pre-primary*	Kindergarten (3-6)	Trained in special schools at upper secondary level or in special training colleges at post-secondary level.	5 years 2 years	☒ Yes ☐ No
	Primary	Primary (6-10) and pre-primary	Trained at tertiary level teacher training college. Teachers don't specialize in a specific subject.	3 years	☒ Yes ☐ No
	Secondary	Lower secondary and pre-vocational (10-14) Upper secondary (14-18) and academic secondary lower and upper	Course at a teacher training college. Teachers specialize in at least two subjects. Depending on their subject area, teachers are trained either at universities, fine arts universities or teacher training colleges. Teachers specialize in two subjects.	3 years at least 4,5 years leading to a degree	☒ Yes ☐ No
	Vocational	Vocational school (15-18)	Training for teachers of practical subjects is provided in voc. teacher training schools. For general subjects are trained at universities and arts universities. Teachers of theoretical subjects in higher voc. must have relevant professional experience in addition to university training.	at least 4,5 years leading to a degree	☒ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

ICT for Pre-school teachers

The topic "ICT for education" is not specifically addressed. ICT-Skills are partly trained in specific courses.

ICT for Primary-school teachers

Usage of adequate Computer software and Online-Offers for supplementary education is implemented in different subjects and courses.

ICT for Secondary-school teachers

ICT are integrated in autonomous courses. ICT Basic Courses are offered to all aspirant teachers. ICT technologies are embedded in courses related to a given curriculum area (maths, language, etc). The focus is how ICT can enhance the understanding of a specific area. Educational software and conditions for using it in the classroom are described, trialed and relevant web sites for each areas are studied.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☐ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

Teachers in Austria have the legal obligation of keeping their knowledge at an up-to-date level. While INSET/ further training is thus compulsory, the laws do not stipulate its nature or frequency. Teachers do not have to attend courses if they prefer to study on their own. If vital school-related innovations occur, further training courses may be compulsory.

Since 2001, all teachers subject to the Province Teacher Service Code are obliged to attend 15 hours of INSET activities.The programmes are usually designed for certain target groups, but sometimes interdisciplinary courses are offered that are open to all teachers.

In accordance with the School Organization Act, in-service training is provided by *Pädagogische Institute* which have been established in all nine *Bundesländer* in Austria. A variety of other kinds of bodies (universities, teachers' associations, political parties, churches and the chambers of commerce) also provide in-service and further training courses.

Teachers who attend in-service courses receive only certificates of attendance. There is no bonus for attending a training course nor any immediate effects on teachers' salaries or careers. However, when there is a vacancy (e.g. for a head teacher), priority may be given to the candidates with the highest attendance rates.

Courses are organized in modules or as weekly meetings outside teaching hours can run over a term or a year or even longer.

In-service training is extremely varied both in form and content. It can be organized in the form of workshops, seminars with lectures and discussions, conferences, field trips, industrial visits, etc.

The content of in-service training is extremely varied, ranging from topics connected with the organization of education, to curricular matters, via topics of regional importance and the science of education, which is a particular favourite. Areas such as school management, computer studies, teacher development and classroom management, the new technologies, EU actions and multicultural education are becoming increasingly popular.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

In March 2001, in the context of the European Action Plan e-Europe, the Austrian Ministry for Education (bmbwk) launched a helpful national plan for in-service teacher training in ICT.

Integration of national IT strategies into national educational objectives is still going on. There are many new IT services for the educational organisations and institutions, for example: National Clearing House for eContent, Databases for eContent/e-learning resources, eServices for schools and universities, eContent initiative.

Copyright of Software, laptop classrooms, ECDL – European Computer Driving Licence, EBDL – European Business Driving Licence, IT certificate, IT teacher training, continued education online and business cooperations are main fields in ICT for education in Austria.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☐ specific subject
- ☐ use in classroom
- ☐ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

Teacher training in the Flemish Community is fully integrated into the higher-education structures. Thus, teacher training is not a separate sector or structure within the education system, nor is it organised in specialised, independent institutions.

In general, five different kinds of teachers are to be distinguished:

- The pre-school teacher teaches general and social education to children 3 to 6 years of age. He/she is trained in a college of higher education.
- The primary school teacher teaches general and social education to children 6 to 12 years of age. He/she is trained in a college of higher education.
- The qualified secondary school teacher - group 1 teaches specific subjects to children 12 to 16 years of age (the first and second stages of secondary education, the third stage of technical secondary education for certain subjects, and the third and fourth stages of vocational secondary education). He/she is trained in a college of higher education.
- The qualified secondary school teacher - group 2 teaches specific subjects to pupils 14 to 18 years of age in the second, third, and fourth stage of secondary education. He/she is university trained or (for some branches) in 2-cycle colleges of higher education.
- The secondary school teacher for vocational courses teaches vocational skills in technical and vocational secondary education (mainly second and third stages). He/she takes either some of the courses for the lower secondary teacher or in courses of Social Advancement Education (OSP).

Armand Greefs
Karel de Grote Hogeschool

Since 2002 Armand Greefs has been teaching ICT at the Karel de Grote Hogeschool in Antwerp, Belgium, in initial teacher training for primary and secondary school teachers. Previously he taught ICT-related courses in secondary school for 18 years.

In order to make the teaching profession more attractive, a HRM decree is being prepared which will provide for job differentiation and include measures concerning job descriptions, appraisal and pay. Pay measures will be in line with the 'blueprint for a new pay policy'.

Admission requirements

The admission requirements are exactly the same as for higher education in general.

INITIAL TRAINING OF TEACHERS FOR THE FIRST STAGE OF SECONDARY EDUCATION

On the basis of the competence profiles adopted by the government, it is the responsibility of the teacher trainers to develop appropriate curricula and syllabuses under the supervision of the *inrichtende machten* (organising bodies). It should be stressed that the Decree of 15 December 1998 provides a description of special competencies (attitudes, skills, and knowledge) typical for the future qualified secondary school teacher - group 1.

In the training of qualified secondary school teacher - group 1 different options or specialisations are possible. Every curriculum will be split up into core modules and a study-in-depth module. Each core module counts for 3 points. The in-depth-subjects should always be chosen among the main subjects chosen by the candidate. This gives him/her the right also to teach this subject in the second or third stage of secondary education. Such core modules are theoretically a free combination of different units representing a common value of 3 points (in reality, the choice depends on what the teacher training course is able to offer):

1. POINT UNITS
   Geography, History, English, Mathematics, Physics, Latin, Biology, French, Dutch, Religion, Non-denominational Ethics, Economics, Technology, Information Technology, Sewing, Recreation Gymnastics, General Education (for vocational secondary education).
2. POINTS UNITS

A. Mechanics-electricity, Nutrition and Nursing, Sewing, Business, Beauty care and Hairdressing, Timber and Construction, and Biotechnology, Agriculture, and Horticulture;

B. Music, Plastic Arts Education, and Physical Education.

Recreation Gymnastics may only be chosen in combination with Physical Education.

One of the components of the core module (with the exception of Latin and Technology) may be chosen as a supplementary in-depth subject. In addition, other equivalencies to in-depth courses are possible:

- German,
- Chemistry (only for candidates who have chosen Physics and Biology as the core module).

In some cases, two components may be chosen as supplementary in-depth subjects: General Education in combination with a component of the following group: Geography, History, English, Mathematics, Physics, Biology, French, Dutch, Religion, Non-denominational Ethics, Economics. For each of the chosen subjects, didactics and the practice of teaching are also given along with the theoretical knowledge.

INITIAL ACADEMIC TRAINING OF TEACHERS FOR UPPER SECONDARY EDUCATION

The qualified secondary school teacher - group 2 teaches specific subjects to pupils aged from 14 to 18 years in the second, third, and fourth stages of secondary education. He is trained at the universities or (for some branches) in 2-cycle *hogeschoolonderwijs* (education at colleges of higher education). In *hogescholen* (colleges of higher education) this teacher training is called the "initial training of academic level of teachers for upper secondary education". The *geaggregeerde voor het secundair onderwijs - groep 2* (qualified secondary school teacher - group 2) has a diploma with the degree of *licentiaat* (licentiate) or *meester* (master of arts) (if trained in audio, visual, plastic arts or music and dramatic arts). Teacher training for these candidates is at least a supplementary part-time programme. Teachers holding a university degree in classical studies may teach Latin and Greek in the first stage of secondary education (lower secondary) as well.

The Circular Letter of 19th July 1999 has taken some measures to increase the availability of personnel and the autonomy of the schools in the recruitment of new personnel. From now on the *licentiaat* (licentiate) degree is no longer necessary for a secondary school teaching certificate. The licentiates who have educational qualification (for example the qualified secondary school teacher - group 1) or a *Getuigschrift Pedagogische Bekwaamheid* (Certificate of teaching skill) (GPB) are considered to be a *licentiaat* (licentiate) with the qualification of a qualified secondary school teacher - group 2.

CONTENT AREAS

Integrated into second-cycle academic training, at least 270 hours of study activities are organised as part of the academic initial teacher training. Students who already have completed their academic training and have obtained a diploma must attend these training courses. Another 600 to 750 hours of study activities as part of the academic initial teacher training have to be attended (including at least 1/3 of the time for

monitored teaching practice). These activities may be attended parallel to the main (subject-oriented) basic training or afterwards. A combination of both (partly parallel, partly afterwards) is possible as well.

Initial teacher training: curricular framework of ICT for education

As a reaction to an evaluation report of teacher training produced in 2000-2001 ICT became a major concern in teacher training. The ICT-skills of the students after secondary school are not sufficient. There are 22 teacher-training institutes in non-university education. In most cases there was introduced a new course "ICT", based on self-learning. The ECDL was widely taken as guidance for the goals of the course. At the same time, all other courses tried to embed ICT.

ICT FOR NURSERY SCHOOL TEACHERS

Most of them work in the way described above. Others, who are evolving to a modular system, are giving ICT as "skill-route" (a course that runs beside the modules.) In addition to the ECDL, skills of video, photo and sound processing are demanded of the students. It is expected that students can use e-mail, can search on the Internet, and can use a word-processor to make tasks and preparations during their studies. A major concern here is the fact that in almost all nursery school classrooms one or two computers are present.

ICT FOR PRIMARY AND SECONDARY SCHOOL TEACHERS

Students develop their skills through self-learning and demonstrate the skills through the completion of tasks. In addition to the ECDL, multimedia skills and knowledge of simple authoring software (like Hot Potatoes) is required. The primary goal of the "ICT-course" is that students have a thorough mastery of ICT themselves. It is expected that students can use e-mail, can search on the Internet, and can use a word-processor to complete tasks, do preparation and compile reports during their studies.

Organisation: 10 or more sessions on topics of ICT (System software, word processing, e-mail, spreadsheet,…) for the students who think they need it; an exam and/or tasks for every student. Lecturers of the core courses embed ICT, but they are unfamiliar with ICT themselves. For some courses they have to make presentations on the computer.

In most of the *Hogescholen* and Universities, an Electronic learning environment is present and many lecturers use this system.

How initial teacher training is carried out

Systematic data on methods are not available at a national level. However there are *Hogescholen* which deliver blended courses on ICT for education. An Electronic Learning Environment is used (like Blackboard, Natschool).

In these courses classes are delivered by the lecturer and online lessons are committed to the tutor, who sets the students individual and collaborative activities and supports them in the preparation for the exam. In some cases the online and classroom learning activities are closely connected and harmonized; in other cases there is a weak link among F2F lectures and online activities. Through access to an online environment students can retrieve the learning material, complete evaluations and participate in the forum to communicate with their tutor and colleagues and to perform tasks.

In some courses the acquired knowledge can also be tried out in laboratories or during the apprenticeship period. In practice:

- the students have to use word processing to do their preparation for lessons;

- they use e-mail to communicate with colleagues and lecturers;
- they use the internet to find inspiration and documentation for lessons and tasks;
- they use websites to exchange information about the apprenticeship periods.

In-service teacher training: objectives, subject areas and bodies

In-service training is gradually being established for a broad range of topics such as educational methods, management, social skills. Institutions for tertiary education are involved in the development of such courses. Especially for primary school teachers and heads, voluntary, three-year part-time courses were organised in collaboration with the former Teacher Training Institutes. These courses are integrated into the new higher education institutes. These courses lead to the *Diploma van Hoger Opvoedkundige Studiën* (diploma of higher pedagogical studies - DHOS). Holders of this diploma receive a small increase in salary.

In-service teacher training: curricular framework of ICT for education

Under the INSET scheme, funds are given directly to the schools. Only a small budget is still available for the encouragement of certain topics 'top-down'. The Minister of Education regularly sets out his priorities. INSET courses meeting these targets are funded by the authorities.

Types of Institutions

Under the previous scheme, in-service training centres under the three *onderwijsnetten* (educational networks) were set up to co-ordinate continuing training activities. After 1984, it was arranged for teachers taking part in continuing training schemes to be replaced at school by novice teachers, who were thus provided an opportunity to gain professional experience. This logic is reversed totally. Schools no longer have 'privileged' partners; they can choose the partners they want.

With extra funds, regional expertise networks were developed in 2000. These expertise networks are intended for all kinds of co-operation, with the essential task being providing in-service training. Besides that, the networks are expected to use their expertise for technical and organisational support. At least one teacher training department of an University and of an Institution for Higher Education take part in one of the networks. Five regional expertise networks, one for each province were approved by the Flemish Government.

Admission Requirements

There are no real admission requirements. All teachers have the right to participate in all in-service programmes. Financial concessions have also been offered to make continuing training activities more attractive to potential trainees. Thus, continuing training schemes are free for teachers taking part in them: there are no enrolment fees and travel expenses are refunded.

Curriculum, Duration of Studies, Specialisation

There are no fixed rules for the structural organisation of in-service programmes. All variations are organised (at school, in training centres, one day, several days).

Methods

The methodological approaches come under the authority of the *inrichtende machten* (organising bodies). Therefore, no official rules have been issued.

Evaluation, Certification

Certificates may be granted after the completion of a training to the concerned teacher, but they, in general, have no legal implications (e.g. a change of his/her qualifications)

for the individual. Practically, different organisations give in-service teacher training. Teachers ask their board for a training course, or they are obliged to follow a training course. Costs are paid by the institute of the teacher. Each educational institute is obliged to spend a certain amount on training each year.

How in-service teacher training is carried out

It is clear that many different methods are used in in-service training. Mostly F2F. Where it is needed, the training is given in computer classes.

Teachers actual competencies and tasks in using ICT

In a study of in-service training needs, one section dealt with the actual competencies of teachers in using ICT. It is striking that for every competence almost none of the respondents consider the teachers as advanced. This is obvious when one looks at the averages: none of the answers reaches 2, the code for basic knowledge.

Concerning "development and maintenance of a website" and "identifying and solving the most common ICT-problems" none of the respondents considers a teacher of his institute as advanced. The teachers are better in the "Didactic use of office suites". "Working with multimedia" too is less developed.

Table. The degree of mastering ICT-competencies of teachers in Belgium

Competencies	0 not mastered	1 novice	2 basic mastered	3 Advanced	Average
Technical					
1. Technical competencies in using ICT (N = 178)	14.0%	33.1%	51.1%	1.7%	1.40
2. Didactic use of office suites (N = 176)	3.4%	23.9%	67.0%	5.7%	1.75
3. Using multimedia (N = 177)	43.5%	39.0%	15.8%	1.7%	0.76
4. Development and maintenance of a website (N = 178)	84.3%	13.5%	2.2%	0%	0.18
5. Determinating and solving the most common ICT-problems (N = 177)	80.8%	16.4%	2.8%	0%	0.22
Pedagogic-didactic					
6. Knowledge of the policy of the authorities about using ICT in teaching practice (N = 174)	28.2%	42.5%	25.9%	3.4%	1.05
7. Selection and evaluation of educational software (N = 178)	12.4%	41.6%	41.0%	5.1%	1.39
8. Integration of educational software in the teaching practice (N = 179)	5.0%	38.5%	48.0%	8.4%	1.60
9. Knowledge of the possibilities that internet offers for their teaching practice (N = 178)	6.2%	44.9%	41.0%	7.9%	1.51
10. Using ICT as a didactic tool in specific themes /courses (N = 178)	6.7%	38.2%	47.2%	7.9%	1.56
11. Use of e-learning to support the lessons (N = 165)	70.3%	21.8%	6.7%	1.2%	0.39
Organizing					
12. Help to develop a vision concerning the use of ICT in teaching (N = 174)	46.6%	37.4%	13.8%	2.3%	0.72

Problems that teachers face in using ICT in their practice

Infrastructure

The most common problems are the "absence of suitable rooms and infrastructure" (e.g. the absence or malfunction of networks) and "the availability of financial means to buy computers". The "number of available computers" and the "quality of the computers" are also a problem.

Support

The hours of presence of an ICT co-ordinator are considered far too few. The time waiting for help is too long.

Other problems

Teachers consider their ability to integrate ICT in a good pedagogic-didactic manner as a major problem. They doubt their own knowledge (pupils know it better).

Content areas involved in teachers' competencies profile in ICT for education

The following texts are parts of the *Draft of Decision of the Flemish Government regarding basic-competencies of the teachers*, which will acquire the force of law on September 1st, 2004.

Nursery school teachers

1.3.4 He can utilize learn and develop chances from the interaction with the child. The supporting knowledge encloses the adapted information sources and materials for the development offer, including the possibilities offered by ICT.

1.5.3. The teacher can use multimedia working forms, including ICT.

1.5.4. The teacher can differentiate his approach. The supporting knowledge includes diverse working and group-activities and combinations of them, considering a differentiated approach and with a critical use of ICT and new multimedia possibilities.

1.6.1 The teacher can, among other things, with help of ICT, find information about development-materials, consult and critically judge the information, considering the special needs of the target group.

1.6.2 The teacher can use adequate development-materials and adapt them. The supporting knowledge includes relevant sources to find development materials, among other things, with help of ICT, together with criteria to judge the found information.

1.7.3 The teacher can integrate ICT functionally in the design of a powerful learning environment.

1.7.7 The teacher can make the pupils think about their learning process. The supporting knowledge includes the characteristics of a powerful learning environment. Included the role of an adapted use of language in it and the possibilities and functionality of ICT.

4.3.1 The teacher can in a correct way handle administrative tasks that belong to the responsibility of the teacher, and if appropriate use ICT.

4.4.1 The teacher can design demanding and possible playing, learning and working provisions in a room, with attention for integration of ICT.

Primary school teachers

1.5.3. The teacher can use multimedia in a functional way.

1.5.4 The teacher can differentiate his approach if needed. The supporting knowledge

includes diverse working and group-activities and combinations of them, considering a differentiated approach and with a critical use multimedia possibilities.

1.6.1 The teacher can find information about educational appliances, consult the information (among other things, with help of ICT) and critical judge these information.

1.6.2 The teacher can on the basis of this information choose educational appliances, considering the special needs and characteristics of the target group.

1.7.3 The teacher can integrate ICT functionally in the design of a powerful learning environment.

Secondary school teachers

1.5.1. The teacher can choose (multimedia) learning methods and attune them to the goals, considering individual differences.

1.5.2 The teacher can choose proper group-formations, create an adapted space and set a good timing.

The supporting knowledge includes diverse working and group-activities and combinations of them, considering a differentiated approach and with a critical use multimedia possibilities.

1.6.1 The teacher can find information about educational appliances, consult the information (among other things, with help of ICT), considering the special needs of the target group and of individual pupils.

1.6.2 If needed, he can adapt the educational appliances to the target group and the circumstances. The supporting knowledge includes relevant sources to find development-materials, together with criteria to judge the found information.

INFORMATION SHEET OF BELGIUM (FLEMISH)

	Typology of teacher	Educational level	Model of teacher training	Duration	National standard
INITIAL TEACHER TRAINING SYSTEM	*Pre-primary*	pre-primary (3-6)	Trained in colleges of higher education		☐ Yes ☒ No
	Primary	primary (6-12)	Trained in colleges of higher education		☐ Yes ☒ No
	Secondary	2 types of teachers: - *group 1* teaches in the 1st and 2nd stage of secondary educ. (12-16), in the 3rd stage of technical educ. (16-18) and in the 4th stage of vocational (18-20) - *group 2* teaches in 2-3-4th stages of secondary (14-18)	- *group 1* is trained in universities to teach specific subjects. For each of the chosen subject, didatics and the practice of teaching are also given along with the theoretical knowledge. - *group 2* is trained at the universities (diploma with degree of licentiate + a supplementary part-time programme) or (for some branches) in 2-cycle colleges of higher education.	4/5 years: 600/750h of study activities (1/3 for monitored teaching practice)	☒ Yes ☐ No
	Vocational	Technical and vocational secondary education	Same courses of group 1 or other type of courses.		☐ Yes ☒ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

In most cases there was introduced a new course "ICT" based on self-learning, whose goals ECDL was taken as guidance.

ICT for nursery teachers

Some institutes are giving ICT as "skill-route" (a course that runs beside the modules). In addition to the ECDL, skills of video, photo and sound processing are demanded.

ICT for primary and secondary teachers

Students develop their skills through self-learning and demonstrate the skills through the completion of tasks. In addition to the ECDL, multimedia skills and knowledge of simple authoring software (like Hot Potatoes) are required.
10 or more sessions on topics of ICT (system software, word processing, e-mail, spreadsheet,…) are given for the students who think they need it, with a final exam and/or tasks.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☐ specific subject
- ☐ use in classroom
- ☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

In-service training is gradually being established for a broad range of topics such as educational methods, management, social skills.
Especially for primary school teachers and heads, voluntary, three-year part-time courses were organized in collaboration with the former Teacher Training Institutes. These courses are integrated into the new higher education institutes and lead to the diploma of higher pedagogical studies (DHOS). Holders of this diploma receive a small increase in salary.
Generally, different organizations give in-service teacher training. Teachers ask their board for a training course, or they are obliged to follow it. Certificates may be granted after the completion of a training to the concerned teacher, but they, in general, have no legal implications (e.g. change of qualifications) for the individual.
There are no fixed rules for the structural organisation of in-service programmes

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

No information about ICT in in-service teacher training

Focus of training pertaining to ICT for education

- ☐ use of applications (personnel utilities)
- ☐ digital literacy
- ☐ specific subject
- ☐ use in classroom
- ☐ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

The type of the initial training of Czech teachers depends on the educational sector a teacher wants work in and his/her individual area of specialization. University degree is required from teachers on all levels of education except for nursery schools on the pre-primary education level.

INITIAL TEACHER TRAINING FOR PRE-PRIMARY EDUCATION

The initial training of pre-primary education teachers in nursery schools is provided by specialised upper secondary schools or less frequently by HE schools or universities.

The specialised upper secondary pedagogical schools offer, in addition to nursery school pedagogy, programmes in extracurricular education and in social pedagogy. A rather exceptional type of school is a pedagogical lyceum, which combines traditional secondary general education with vocational education, and there are also HE schools offering pre-primary education teacher training in this area.

Zdena Lustigova
Charles University
Prague

Lustigova's educational and research work has concentrated on computer aided science education, especially on computer based laboratory work, on telecommunications technologies in education and computer based distance education. She focuses mainly on in-service teacher training, international online education and communication projects, and remote laboratories.

The key subjects in a upper secondary pedagogical schools are Nursery School Teacher Training and Pre-school and Extracurricular Education. The curriculum includes both general and vocational subjects and student teaching practice in the 3rd and 4th year of study.

The curriculum of a pedagogical lyceum contains general subjects, Pedagogy and Psychology. There are also optional subjects, such as Music, Arts, Drama, Physical Education, foreign Language or Humanities. Students are required to attend student teaching practice in the 3rd to 4th years. The Ministry of Education, Czech Republic, is in charge of control over the content and organisation of education. It also approves the curricula and textbooks used in schools. The curricular development is supported by specialised institutes, which determine educational standards. Schools design their own educational programmes within the basic curriculum. Individual HE institutions design the contents of their curricula themselves.

Since 1st September 1999, the workload for nursery school teachers has been decreased to 31 hours per week. They usually work full-time. Virtually, all pre-primary school school teachers are female, although the profession is open to both sexes.

INITIAL TEACHER TRAINING FOR PRIMARY EDUCATION

Teacher Training for Primary Education (1st stage, year 1 to 5, ISCED 1) is provided by universities. In general, primary education teachers have general education background and are qualified to teach all subjects at this level.

The Accreditation Commission is responsible for comparative evaluation of the given field of study at all faculties of education. The curriculum consists of five key modules:

1. subject module (the basics of all subjects taught at the first stage of the primary education);
2. pedagogical and psychological module (including student teaching);
3. university basics module (Philosophy, History, Rhetoric, Ecology, Computer Technology, etc.);

4. didactic module (theory and practice of teaching individual subjects at the first stage of the primary education);
5. upgrading module.

Each student is required to choose one area of specialisation – e.g. Music, Visual Arts or Physical Education. The studies usually last from eight to ten terms (one term=15 weeks), and there are on average 20 hours of direct teaching (classes) each week.

Faculties of Education are completely autonomous what concerns the content of training and the time allocated to different subjects. There are no official reports/documents describing the actual practice of the faculties available at this moment.

INITIAL TEACHER TRAINING FOR GENERAL SUBJECTS IN SECONDARY EDUCATION

Teacher training for the 2nd stage in the primary education (year 6 - 9, ISCED 2) and general subjects in secondary education (providing educational level ISCED 3) is provided by HE institutions. In general these teachers are qualified in two key subjects.

Teachers at the 2nd stage of primary education are trained at faculties of education. Teachers of general subjects in upper secondary education can obtain their qualification either at Faculties of Education, Faculties of Philosophy, of Natural Sciences, Mathematics and Physics, or at Faculties of Physical Education and Sports.

Teachers of arts subjects in primary education and teachers of special subjects in primary arts schools are required at least to have completed studies in upper secondary art school in the relevant specialisation, or to have a university degree in the relevant field.

The curriculum of teacher training in general subjects consists of:

1. subject studies;
2. pedagogical training (teaching methodology, pedagogical and psychological courses and student teaching);
3. general education.

Training institutions are autonomous about what concerns the content of training and the time allocated to different subjects. There are no official reports/documents describing the actual practice of the faculties available at this moment.

Teachers in the 2nd stage of primary education (i.e. lower secondary education) and teachers of general education subjects in upper secondary education are qualified as subject specialists or semi-specialists and at certain HE institutions they obtain qualification enabling them to choose between teaching at the lower or upper secondary school level.

The teacher training is generally separate for teachers in lower and upper secondary education. Teachers with the qualification for upper secondary education are allowed to teach at the lower secondary level, but not vice versa.

Teachers are trained in four or five-year courses, most frequently in two major subjects. There are certain subjects combinations the students can select from at the beginning of the study, or they can make their individual selection from the list of subjects offered by the faculty. In general the course usually lasts from eight to ten terms, each of 15 weeks, and there are on average 20 hours of direct teaching each week (depends on the faculty).

Initial teacher training can be concurrent, i.e. it generally begins after the second year of study and lasts from three to four semesters, or consecutive.

The required teaching load for teachers on the upper secondary level is 21 lessons per week.

INITIAL TEACHER TRAINING FOR TECHNICAL AND VOCATIONAL SUBJECTS IN SECONDARY EDUCATION

Teacher training for technical and vocational subjects in secondary education concerns both teachers of general subjects and teachers of vocational theoretical subjects in

secondary education. Teachers of vocational subjects are trained at various types of universities and HE institutions (e.g. Technical Universities, Universities of Agriculture, Economics, Theology and Fine Arts, or Faculties of Medicine, etc). Their methodological studies are organised concurrently or more often consecutively. The teaching qualification can also be obtained in consecutive studies in certain Faculties of Education. Teachers of vocational subjects obtain their teaching qualification either in concurrent studies (which are offered only by some universities) or, more often, in consecutive, or so-called complementary pedagogical courses, provided primarily by Faculties of Education. The part-time courses usually last two years and focus primarily on pedagogical and psychological training.

Initial teacher training: curricular framework of ICT for education

The curriculum framework of ICT for education in initial teacher training is managed by the centralised Committee of Departmental Didactics (*Rada oborovỳch didaktiků*). The ICT training is designed as a two-stage system, i.e. 1st stage – basic user's skills, 2nd stage - pedagogical use:

- 1st stage - Each student is required to pass a test in ICT (Course in ICT) in the first phase of his/her studies. Successful completion of the ICT course is a pre-requirement for all the ICT oriented courses. Some departments may offer compulsory or optional subject oriented courses in PC skills (SW for different subjects - Mathematics, Physics, Chemistry, etc., or Web design, PC graphics, Office SW, etc.);
- 2nd stage - Majority of departments offers a compulsory course in Computer-aided Teaching (approx. 1 seminar/week). The objective is to introduce teachers to the use of ICT in class as a support media (Internet in education, PC labs, lesson planning, educational SW, learning objects, virtual teachers communities, etc.). The course content may be included in the General Didactics course in some cases.

The range of ICT oriented courses offered in the framework of ICT for education in initial teacher training (primary and secondary level) vary according to the technical and staff potentials of each university. Majority of the ICT oriented courses are optional and subject specific.

The use of ICT in initial teacher training is also dependant on individual approach of teachers. ICT oriented courses in the framework of initial teacher training are offered in the area of natural sciences (for future Physics, Mathematics, Chemistry, Geography teachers), e.g. SW for Chemistry education, Computer-aided chemistry experiments, Educational tools and ICT in Chemistry, Computer graphics in Chemistry, Internet for Chemistry teachers, Internet and Web design, Programming in Physics, SW for Mathematics and Physics, etc.

Some universities also incorporate ICT into the organisational scheme, i.e. class management – web-based information about requirements, resources, office hours, etc., teachers may use ICT for communication with students, some departments provide web-based study materials.

How initial teacher training is carried out

Initial teacher training is primarily lecture based, depending on the technical and staff potentials of each university. In general lectures are complemented with seminars and labs (approx. 15 students). Some universities offer e-learning courses or e-learning support, especially in case of a higher number of students signed in.

On average 1/3 of each course involves ICT (for presentation, communication, collaboration, testing, etc.). Majority of Czech universities use different LMS for online or

blended learning. The most frequently used LMS are: Moodle (Open source), Learning Space (Lotus Notes), WebCT, EDEN.

In-service teacher training: objectives, subject areas and bodies

The law stipulates an obligation of in-service training of teachers, but does not define any particular format. Teachers may prefer the option of self-study and participation in training is voluntary. The system of in-service training collapsed in 1991 and the Ministry of Education is currently preparing a new concept. The Ministry is at present responsible for 14 Education Centres (*Pedagogická centra*) and one for the Polish minority which offer further teacher training, support services, and information and library services. Higher education institutions offer further and refresher training. Scientific societies, professional associations and various private organisations also participate in further training.

There are also various types of further teacher training: induction course for teachers at the start of their career, refresher training for teachers returning to the profession after a long interval, qualification training courses providing upgrading of educational qualifications, specialised course, and educational studies for graduates from non-teacher training faculties.

A unit for in-service training of teachers is part of the Department of Organisation and Management Activities and Further Adult Education at the Ministry of Education, Youth and Sports (www.msmt.cz). Institutions attempting to offer in-service teacher training, for which the schools have allocated funds from the Ministry of Education, have to apply for a certificate of competence (i.e. accreditation). The Accreditation Commission for in-service training approves and delivers certificates to institutions providing in-service teacher training. The commission, which is an advisory body of the Ministry of Education, authorises various legal entities, both inside and outside the education sector, to provide in-service training for teachers. Accreditation of educational programmes is required in case of both in-service teacher-training institutions and universities for their post-graduate courses (only if they are not included in the regular study programmes and are not subject to another body).

The number of institutions offering in-service training is very high but there is a lack of system and clear priorities.

In-service teacher training is provided by institutions administered by the Ministry of Education, Youth and Sports as well as by other Ministries. These include regional educational centres, HE institutions, civic associations, foundations, commercial organisations, professional associations and individual schools. Some regional departments of education establish their own centres for in-service training. All institutions have to be certified (accredited) for in-service teacher training.

In-service teacher training is based on optional courses provided during working and non-working hours.

There is no unified curriculum for further training of teachers or their professional development. The national educational policy was articulated in 2001 in the National Programme of the Development of Education in the Czech Republic (White Paper, http://www.msmt.cz/Files/PDF/WhitePaper.pdf). The in-service teacher-training curriculum draws on the standards and curriculum of the education system.

In-service training of teachers is offered in the following areas:

- professional innovation in individual subjects;
- methodology (training in methodology, general and subject-specific pedagogical approaches, new teaching methods);

- new nation-wide educational programmes;
- school management;
- language teaching;
- new fields and inter-disciplinary fields (Ecology, European Integration, Informatics and Information Technology, Drama, etc.);
- special methodology;
- integration of disabled people;
- professional and personal development of teachers;
- development of teaching staff, schools.

Some types of further training of teachers are for set periods and their curriculum is accredited, i.e. programmes provided by certified HE institutions:

- additional training at universities for teachers specialised in certain fields who, for various reasons, want to change or extend their specialisation (including re-training as with teachers of Russian studying English);
- specialisation studies - preparation for the carrying out of specialised activities (e.g. educational guidance studies);
- complementary studies - complementing a professional qualification with a teaching qualification (e.g. complementary pedagogical courses for teachers in secondary vocational schools, without teaching qualification);
- functional studies - e.g. school management (courses for school heads, deputy directors, school inspectors, directors of educational institutions and administration etc.);
- lifelong learning.

The above listed courses have a considerable impact on the individual assessment of the teacher and the category of qualification the teacher is assigned to. The most extensive offer is that of regional pedagogical centres, but these are very often isolated activities, without a systematic educational plan. The courses offered by HE institutions are wide-ranging and of high quality.

In-service teacher training: curricular framework of ICT for education

ICT education is designed primarily for teachers on the pre-primary, primary, secondary and special needs schools.

Structure of ICT education

ICT education is a four-level system
Z ... basic user's knowledge
P ... training for advanced users
S ... training focused on special skills/knowledge
N ... training for school computer network administrators – ICT coordinators

"Z" type training is designed for beginners who have no experience with using ICT. The main objectives of the training are to motivate teachers to use computers at home as well as in schools, and provide them with basic user´s skills and knowledge in the area of ICT use.
Teachers are trained to use PCs for personal, daily use:

Operational system
Network
Text editor
E-mail
Internet search

"P" type training consists of 3 modules and is designed for more advanced users. The pre-required skills/knowledge draw on the "Z" training level. The primary objectives are to provide teachers with necessary ICT skills/knowledge/competence they need when using ICT in class. The module content and form should respect the specific needs of

each type of school. The content of the introductory module is the same for each type of school. On completing the introductory module, teachers can choose two optional modules that are actually offered (e.g. ICT in Physics Education, Graphical Communication, Electronic Publishing, etc.). Teachers are required to complete the final task for each optional module – the final project – and suceed in defending it.
"S" type training is designed for all teachers willing to develop their professional qualification in the area of ICT. Schools can use the state financial support for ICT education (courses, seminars, workshops, trainings, etc.) accredited by the Ministry of Education withing the program of In-service Teacher Training (*DVPP – Další vzdělávání pedagogických pracovníků*).
"N" type training is designed for ICT coordinators in schools (school computer network administrators). Schools can also use the state financial support for ICT education (courses, seminars, workshops, trainings, etc.) accredited by the Ministry of Education within the program of In-service Teacher Training (*DVPP – Další vzdělávání pedagogických pracovníků)*
Source in Czech only (http://www.msmt.cz/_DOMEK/default.asp?CAI=3138).

Official criteria for 2006

75 % of teachers will accomplish "Z" level
25 % of teachers will accomplish " P" level
Only those training centres, listed on the E-gram Portal (www.e-gram.cz), are authorized to organize "Z" and "P" trainings.

Application modules

Database systems
Advanced text editing and DTP
Computer grafics and digital photography
Internet publishing
Tabular calculators
Multimedia and media in education
CAD technology
Computer networks in education (E-learning)

Discipline oriented modules

Informatics A – High Schools
Informatics B – Technical/Vocational Schools
Informatics C – children´s programming languages
ICT in pre-primary education
ICT in primary education
ICT in Mathematics Education
ICT in Physics Education
ICT in Chemistry Education
ICT in Music Education
ICT in Geography Education
ICT in Biology Education
ICT in Language Education
ICT in Arts Education
ICT in Czech Language Education
ICT in History Education and other.

How in-service teacher training is carried out

In general, ICT are frequently used in all areas of in-service teacher training. ICT are commonly used for presentation, communication, collaboration and testing in in-service teacher training, e.g. there has been a tendency towards a wider use of ICT and Internet

tools resulting in the State Information Policy in Education Program called "Information literacy". The aim is to incorporate ICT into in-service teacher training and train teachers in using ICT in class. Majority of the courses and seminars arranged within this framework are distance courses (guided independent studies, blended or online courses, etc.) or tutorials, seminars and workshops (approx. 1-3 days). E-learning and ICT tools have become a popular and effective way of providing training for geographically dispersed teachers, moreover, e-learning is not strictly time bound, therefore, enables teachers to be more time flexible. Among the most widely used tools are e-mail for communication, Internet in general for information search, educational SW for presentation, experiments, simulations, data collecting and processing, etc. Still there are teachers who prefer traditional face-to-face lectures and seminars to modern teaching and learning methods (due to age, lack of PC skills and language skills, cost, technical equipment, etc.).

Teachers actual competencies and tasks in using ICT

Teachers know how to use computers on the user´s level, i.e. basic PC skills. Some of them apply the same style of work in class (office work, Internet search, etc.). Teachers have little knowledge about available educational SW, applications or learning objects, they do not have appropriate methodology and skills in using them. Majority of teachers who use computers in class have not been able to change their attitudes to teaching and use computer as an effective educational tool. They often use computers as a complement to the traditional face-to-face lecture. Initial teacher training provides knowledge about the existing ICT tools, SW and applications, but does not provide instructions on methodology and modern, computer-aided teaching methods.

Generally, teachers are not used to using computers and ICT in class, moreover, teachers are not externally motivated to use computers for educational purposes in class, often it is the school management that decides according to staff and financial conditions.

Teachers use ICT for information search (information from their area of interest), for obtaining images and study materials and for e-mailing, of course. There are only a few teachers who can actually create some electronic study materials, implement them into some environment for presentation and use them for educational purposes. They prefer to use ready-to-use products developed by commercial companies. The key competencies in using ICT in education are (based on a survey among in-service teacher trainers):

- Knowledge of operational system, document management
- User's skills in MS Office (MS Word, MS Excel, PowerPoint)
- Use of digital devices (digital camera, video camera, dataprojector, scanner, etc.)
- Image processing, audio and video, multimedia presentations
- Use of the Internet, Web browser, e-mail
- Knowledge of educational SW (for specific subjects)
- Didactic skills in using ICT in class
- Class management using ICT
- Evaluation of educational SW for special purposes
- Willingness and motivation to use ICT in class!!!

The State Information Policy report presents the outcomes achieved by the end of 2003: 62,5% of all teachers completed the "Z" and "P" type training (i.e. basic ICT skills, and advanced ICT skills); more than 30% of all teachers started the "P" type training consisting of three modules; in 2003 teachers from 54% of all schools connected to the Internet use computer and the Internet in class, 30% of all teachers use the Internet actively in class (source in Czech only: http://www.e-gram.cz/index.asp?linkid=131519143459&jazyk=cz http://www.e-gram.cz/userfiles/141322121112/files/MSMT_A3_2.pdf).

Problems that teachers face in using ICT in their practice

One of the main issues is the lack of technical equipment or the low quality of facilities in schools (lack of computers, slow Internet connection, etc.). There has been a program in the framework of the State Information Policy in Education called "Infrastructure", that should provide financial support to schools for building a computer infrastructure and purchasing ICT. According to the survey carried out by the Institute for Information in Education (UIV), there are still 10% of schools that do not have sufficient computer infrastructure established. These schools will be provided financial support by the Ministry of Education in the period between 2005-2006 (source in Czech only http://www.e-gram.cz/index.asp?linkid=131519143459&jazyk=cz
http://www.e-gram.cz/userfiles/141322121112/files/MSMT_A3_2.pdf).
On the centralised level, the Ministry of Education, there is a lack of initiative to support actual development of study materials, educational SW and applications. The teachers are also missing a centralised, reliable source of information, i.e. a centralised educational portal (proposals have already been made) (source in Czech only
http://www.msmt.cz/files/pdf/MHPortal_studie.pdf
http://www.msmt.cz/files/pdf/MHStudie_SIVP_v1.4_nazverejneni.pdf).
In-service teacher training is not an obligation of teachers, there are no positive or negative sanctions based on their participation on in-service teacher training, there, teachers lack motivation for further education. Development of in-service teacher training in the framework of the State Information Policy in Education on the centralised level is rather slow and not flexible enough to respond to teachers´ needs. There is not a quality control system except of the Ministry of Education accreditation system that would evaluate the quality of in-service teacher training and guarantee its quality.

INFORMATION SHEET OF CZECH REPUBLIC

	Typology of teacher	Educational level	Model of teacher training	Duration	National standard
INITIAL TEACHER TRAINING SYSTEM	*Pre-primary*	Nursery (3-6)	University degree not required		☐ Yes ☒ No
	Primary	primary education (6-11)	Universities provide general educational background and qualification to teach all subjects. Students choose one area of specialisation.	4/5 years, with 20 hours of direct teaching each week.	☒ Yes ☐ No
	Secondary	lower and/or upper secondary education. Teachers of upper may teach in lower level and not viceversa.	Training is provided by Faculties of Education for teachers in lower/ either Faculties of Education, Philosophy, Natural Sciences, Maths and Physics, Physical Educ. for teachers in upper. Teachers are qualified to teach 2 subjects. Teacher training can be concurrent (it begins after the second year of study and lasts 3/4 semesters) or consecutive.	4/5 years +20 hours of direct teaching each week	☒ Yes ☐ No
	Vocational	Low and upper secondary education	Concurrent studies are offered by some universities, more often consecutive studies are offered by Faculties of Education	pedagogical part-time courses of 2 years	☐ Yes ☒ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

It's managed by the Committee of Departmental Didatics. ICT training is designed as a 2-stage system:
1) basic user's skills; 2) pedagogical use.
1st stage -> test in ICT is a pre-requirement for all ICT courses. Some departments offer subject oriented courses in PC skills.
2nd stage -> majority of departments offer a compulsory course in Computer-aided Teaching (1 seminar). The objective is introducing teachers to the use of ICT in class as a support media (PC labs, lesson planning, educ. SW, virtual teachers communities, etc.). Majority of ICT oriented courses are optional and subject specific (in the area of natural sciences).

Focus of training pertaining to ICT for education

- ☐ use of applications (personnel utilities)
- ☐ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

The law stipulates obligation but doesn't define any particular format. Teachers may choose the option of self-study. Ministry is responsible for 14 Education Centres and one for the Polish minority which offer further teacher training.
Higher education institutions, scientific societies, professional associations and various private organisations also participate in further training. Institutions attempting to offer in-service training have to be accredited by the ministry.
Types of further teacher training:

- induction course for teachers at the start of their career
- refresher training for teachers returning to the profession after a long interval
- qualification training courses providing upgrading of educational qualifications
- specialised course
- educational studies for graduates from non-teacher training faculties.

There is no unified curriculum for further training of teachers or their professional development. Courses have a considerable impact on the individual assessment of the teacher and on the category of qualification the teacher is assigned to.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

ICT education is designed primarily for teachers on the pre-primary, primary, secondary and special needs schools.
ICT education is a four-level system
Z ... basic user's knowledge
P ... training for advanced users
S ... training focused on special skills/knowledge
N ... training for school computer network administrators – ICT coordinators.
According with Official criteria for 2006:
- 75 % of teachers will accomplish "Z" level
- 25 % of teachers will accomplish "P" level

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☐ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

As the initial teacher training differs for the different levels of the education system, the training programmes of the different types of teachers are dealt with separately.

PRE-SCHOOL TEACHER

In order to become employed as a pre-school teacher (educator), the candidate must have completed the educator-training programme. Pre-school teachers may also teach at the 1st to 4th form levels as well as PE, needlework and home economics at the other form levels of the *Folkeskole*. The training programme gives students the theoretical knowledge and practical experience required in order to work as an educator, and it contributes to furthering the personal development of the student and to developing the students' interest in and ability for active participation in a democratic society.

Pre-school teachers often have a background as pedagogues supplemented by the educator training programme.

Ulla Gjørling
UNI•C

Ulla Gjørling is a chief consultant in UNI•C, The Danish IT Centre for Education and Research. She is responsible for a series of Pedagogical ICT Licences – a concept of teachers' professional development in the pedagogical application of ICT in teaching and learning. She is also involved in a number of European collaboration activities, among which the international uptake of the Pedagogical ICT Licences in the eContent project EPICT, see www.epict.org.

FOLKESKOLE TEACHER

In order to be considered for a teaching post in the *Folkeskole* (compulsory education), a candidate must have completed the *Folkeskole* teacher training programme or other teacher training approved by the Minister of Education in this respect.

Teachers are trained in teacher training colleges. These are semi-autonomous educational institutions with their own curricula. A teacher is a profession bachelor. According to the legislation, the aims of the teacher-training programme are:

- that the students acquire a subject-related and pedagogical insight and a practical basis for their activities in the *Folkeskole* and for other activities related to teaching and presentation,
- that the students - by use of their theoretical and practical qualifications - are trained to co-operate and plan, conduct and evaluate teaching,
- that the personal development of the students is furthered through independent work with the subject-matter, through co-operation and through joint responsibility for their education, and
- that endeavours are made to make the students feel committed to and take pleasure in the work with children and adults enrolled in education.

TEACHERS IN GENERAL UPPER SECONDARY EDUCATION

In order to get appointed for a permanent position in general upper secondary education, the candidate must have completed a postgraduate university degree within one or two of the subjects taught at this level.

Gymnasium and HF: In addition, the Ministry of Education has issued an order concerning the professional postgraduate teacher training for upper secondary school teachers, the so-called *paedagogikum*. According to the legislation, it is the aim of the *paedagogikum* that student teachers shall acquire the theoretical and practical educational basis that enables them to work as teachers at an upper secondary school or an HF-

course. *Paedagogikum* is a two-year training position that combines supplementary training in the second subject of the teacher, theoretical pedagogy and teaching practice.
It is the aim of the *practical paedagogikum* (course in practical teaching) that the candidate - through practical experience - acquire skills and insight into the planning, implementation and evaluation of teaching at general upper secondary level. The candidate must be able to use his subject-specific knowledge in a way, which is relevant for the total teaching and for the individual teaching situations. It is the aim of the *theoretical paedagogikum* to give the candidate the necessary general pedagogical and subject-specific pedagogical basis to work as a teacher in the gymnasium, HF, etc. and to enable him or her to keep updated in the theory that is of importance to their work. It is to enable the candidate to independently define, formulate and treat concrete pedagogical problems in the teaching. The pedagogical application of ICT in education is a compulsory part of *paedagogikum*.
The teaching staff of the vocational colleges are characterised by a variety of different qualifications. The education in colleges can be divided into two groups:

- upper secondary education
- practical vocational education.

In the first category all teachers have a university postgraduate degree in the subject(s) they teach often combined with two years of relevant professional experience.
In the second category teachers usually have a vocational qualification or similar plus five years or more of professional work experience in the subject they teach. The teachers of more general subjects (1/3 of the teachers) have often a university postgraduate degree in the subject they teach or a *folkeskole* teacher education (see above).
All teachers in vocational schools have completed the *vocational paedagogikum* at the Danish Institute for Educational Training of Vocational Teachers.

TEACHERS IN HIGHER EDUCATION

There are no general rules applying to the entire area of higher education regarding the qualifications of the teachers. But teacher candidates must as a rule have a university postgraduate degree or similar in the subject they teach. For full-time positions in the university sector, candidates must have a qualification at PhD. level.
There are no formal rules regarding the *paedagogikum*, but a number of institutions have introduced pedagogical courses. They consist of a practical and a theoretical part. The theoretical part of the course consists of 8 x 3 lessons. The practical part consists of the pedagogical supervision by an experienced colleague for a semester as well as two visits by an external examiner.

Initial teacher training: curricular framework of ICT for education

PRIMARY AND LOWER SECONDARY EDUCATION

In Denmark there is no centrally issued curricular framework for ICT in initial teacher training for teachers in primary and lower secondary education. There is a general formulation of the integration of ICT stating that each teacher training college must define its own implementation of this curriculum.
"Information and communication technology must be integrated in the teaching and learning so that the possibilities of the technology become an integral part of the subject in order to contribute to the development of the topics, concepts and methods of the subject." (my translation of the curriculum for initial teacher training).
"The curricula must contain rules about information and communication technology in the

education, and the curriculum must contain rules of the contents of the subjects on the grounds of the defined objectives and the central knowledge and proficiency areas" (my translation of the curriculum for initial teacher training).
As a consequence each teacher training college is free to formulate its own curriculum for the subjects. They must formulate rules as to the ICT application but browsing the curricula of the individual colleges show that this is done in very different ways and in various degrees of detail: (Seminarium = teacher training college) *varying from Skive Seminarium*, Physics and Chemistry, "*ICT is used as a natural tool*" to *Nørre Nissum Seminarium*, general student use, "*All students will receive a personal access to the Intranet from which they will have access to the SectorNet and the Internet. All subjects and committees will have their own, targeted conference. We seek to establish network to practice schools. All relevant conferences are open and accessible for all students in the education. In special cases closed conferences can be acceptable. Students use the Intratnet to document their participation in the study. During the training the student must present a number of projects/products* (*see the subject-specific part of the curriculum*) *where ICT technolology is used*".

THE PEDAGOGICAL ICT LICENCE

Some teacher training colleges have used the Pedagogical ICT Licence (designed for teachers' in-service training of ICT application) in the initial teacher training although the course and its resources are designed for in-service training. As a consequence of the need for a dedicated framework for teaching pre-service teachers the pedagogical ICT application, the association of head teachers in teacher training colleges with UNI•C have designed a version of the Pedagogical ICT Licence for pre-service teachers. It uses the resources of the Pedagogical ICT Licence (see below) but combines it with an alternative assessment method.
General upper secondary education's *paedagogikum* (see above) has defined a set of ICT competencies that must be covered during the pedagogical training. The competencies derive from the Pedagogical ICT Licence for in-service teachers in upper secondary education and are divided it two groups: general ICT pedagogy and subject-specific ICT pedagogy.
The guidelines for *paedagogikum* suggest that the ICT competencies are covered by five modules of the Pedagogical ICT Licence for teachers in upper secondary education. This part of *paedagogikum* is realised as open, flexible learning:

- internet in education;
- project based learning and ICT;
- three optional modules covering subject-relevant ICT application to be selected in collaboration with a pedagogical mentor.

How initial teacher training is carried out

PRE-SERVICE TEACHERS FOR COMPULSORY EDUCATION

As stated above the initial teacher training is governed by a general curriculum, which is specified in detail by the individual teacher training colleges. Thus the use of ICT tools in teaching and learning varies from school to school. There are no data that attempt to describe the situation. Generally teacher training colleges will apply a series of working methods reflecting the subject, the theme and the general tendencies and learning theories that are most accredited. Methods include project-oriented learning, problem based learning, process writing, group work, peer work, teacher-centred learning, etc. Lecturing is not a dominant form.

1. Large-scale project where the medical business Novo Nordisk gave 10 mio. Dkk to promote the use of ICT in pre-service teacher training.

The Novo Nordic project[1] resulted in a number of projects and certainly helped raise awareness of the need for ICT in pre-service teacher training. Part of the project was the formation of formal network groups that discuss the implementation of ICT in the curricula, discuss ICT application, discuss ICT skills, hardware and tools, etc.
Two colleges were singled out for specific, large-scale projects (*Aalborg and Nørre Nissum*) where as the other 16 colleges participated in small-scale projects. There is no doubt that the Novo Nordic project has changed behaviour among teachers particularly in the two spearhead colleges. In *Blaagaard Seminarium* you can follow the merit-teacher training[2] as flexible learning. *Københavns Dag og Aftenseminarium* has a long tradition for using ICT, collaborative methods, blended learning etc. in their pre-service teacher training.
In 2002 the Ministry of Education initiated the Information Technology and Media Initiative (www.itmf.dk), part of this project was the development of a specifically targeted Pedagogical ICT Licence for professors in initial teacher training addressing the problem that new teachers were unable to implement ICT in a pedagogical way in their own teaching in the schools. More than 60% of all professors in teacher training colleges have begun this training. However, only very few have completed the course. Thus the ICT integration in some teacher training colleges still depends very much upon the dedication, the competencies and especially the interests of the individual professor.

PAEDAGOGIKUM FOR GENERAL UPPER SECONDARY EDUCATION

Paedagogikum (see above) is realized through a blended learning approach where the teachers both attend seminars at the university, participate in electronic conferences and follow university courses online, attend face2face workshops in their practice school and follow online learning courses to cover the ICT parts.

In-service teacher training: objectives, subject areas and bodies

Danish teachers are free to participate in in-service training activities. And unlike many other EU-countries, promotion is not conditional upon having taken part in in-service training activities.

PRE-SCHOOL TEACHERS

Generally speaking, there is no legislation governing teacher in-service training in Denmark. The various in-service training provisions may however be mentioned in other legislation, e.g. the 1-year course for pre-school teachers at the Danish University of Education is regulated by a section in the Appropriations Act.
To supplement this 1-year course the Ministry of Education has supported the development of a Pedagogical ICT Licence for pre-school teachers (SFO-IT). This course has been attended by 40% of all Danish pre-school teachers. The Pedagogical ICT Licence is realised through a blended learning approach. More information about the Pedagogical ICT Licence below.

FOLKESKOLE TEACHERS

As the in-service training provision for *Folkeskole* teachers (compulsory education) is more pronounced than for the other categories of teachers, it will be dealt with in more detail than the others. The in-service training offered to *Folkeskole* teachers by the Danish University

2. Pre-service teacher training for students who have an alternative, relevant degree or education in advance. This may be correspondents, master graduates, skilled workers, etc. The merit-teacher training is two years where as the normal teacher training is four years.

of Education covers all subject areas and all activities in the *Folkeskole* with the exception of physical education and handicraft. In recent years, these courses have been offered on a part-time basis. Most of the courses involve between 60 and 175 teaching hours over approx. 30 weeks. The course schedule is organised to allow teachers to continue their professional activities while partaking in the course.

Colleges of education organise part-time in-service training courses involving between 40 and 150 teaching hours. The content of the courses organised by the regional centres of educational resources is set in conjunction with teachers' associations, the Danish University of Education, municipal authorities, schools etc. These training programmes generally involve between 3 and 20 hours of course work, most often face2face workshops.

The teachers' union also contribute to the in-service training of *Folkeskole* teachers by offering a series of courses about the teaching in school and conferences lasting several days, which address contemporary problems. And the Ministry of Education offers courses on specific topics.

The most common topics in recent years have been:

- differentiation of teaching;
- use of computers in the teaching;
- written presentation (process writing);
- oral presentation;
- health education;
- teaching of bilingual children.

The Pedagogical ICT Licence for teachers in compulsory education (SKOLE-IT) has been attended by more than 79% of all Danish teachers. The Pedagogical ICT Licence is realised through a blended learning approach. For more information about the Pedagogical ICT Licence see www.epict.org and below.

TEACHERS IN GENERAL UPPER SECONDARY EDUCATION

Courses offered to teachers at these institutions can address any aspect of a subject area. In most cases, courses take one of the following forms:

- courses on general pedagogical topics organised within the schools for all teachers. These courses normally last one day;
- "supervision" through co-operation with colleagues at the teachers' own school and with the support of an external consultant;
- pedagogical courses related to subjects taught. At regional level, these courses generally last one day;
- residential courses lasting three to four days are also organised at national level.

VOCATIONAL UPPER SECONDARY EDUCATION

A large number of courses are offered in the fields of pedagogy, general psychology and teaching methods relevant to specific subjects for teachers at vocational colleges.

In-service training is offered in the form of courses, seminars or conferences. Traditional teaching situations are, however, giving way to new pedagogical methods such as interactive teaching, study visits abroad and projects developed in co-operation with local businesses. In-service training now constitutes an integral part of a strategy to develop both the qualifications of the individual teacher and the general profile of the schools concerned.

The Master's programme at the Danish Institute for General Upper Secondary Education (DIG) corresponds to one year of full-time education, but extends over six semesters or three years, as it is the aim that the students are to be able to follow the

Master's programmes concurrently with their employment in the Gymnasium. Each semester comprises 8 evening classes and two weekend seminars. The first two semesters are common for all students, after which they choose one of the following 5 main lines: management, study guidance, subject pedagogic, general pedagogic and IT-pedagogies.

TEACHERS IN VOCATIONAL SECONDARY EDUCATION
A large number of courses are offered in the fields of Pedagogy, General Psychology and teaching methods relevant to specific subjects for teachers at vocational colleges.
The courses for all types of teachers are held on a part-time or full-time basis, as seminars or conferences.

PEDAGOGICAL ICT LICENCE
The Pedagogical ICT Licence for teachers in upper secondary education (GYMNASIE-IT) has been attended by more than 55% of all Danish teachers in upper secondary education. The Pedagogical ICT Licence for teacher in vocational schools (EUD-IT) has been attended by 7% of all teachers in the area. The Pedagogical ICT Licence is realised through a blended learning approach.
The Pedagogical ICT Licence is described in more detail below.
For additional information about the Pedagogical ICT Licence see www.epict.org

In-service teacher training: curricular framework of ICT for education

The Ministry of Education has supported the development of a series of *Pedagogical ICT Licences* for the in-service training of teachers in the pedagogical implementation of ICT. The Pedagogical ICT Licence was developed as a targeted, pedagogical alternative to the European Computer Driver Licence (ECDL), which is not seen to meet the needs of educators.
There is a total of 9 Pedagogical ICT Licences each targeting a specific group of in-service teachers. The content areas of the Licence are presented at the end of this document. For more information see www.epict.org

How in-service teacher training is carried out

The Pedagogical ICT Licences are realised through a blended learning approach where one or two days of introduction is face2face and the rest is teamwork face2face combined with online work in electronic conferences and moderation by an online facilitator.
Some of the diploma courses offered by the Danish University of Education is realised through blended learning. Master courses for teachers in further education are often realised as blended learning.
As a follow-up of the massive coverage of the Pedagogical ICT Licence for teachers in compulsory education the Ministry of Education launches a series of initiatives for in-service training in its latest programme, *IT i Folkeskolen* (ICT in compulsory education). This in-service training focuses heavily on five subject areas: Danish, Maths, Natural Sciences, English and Art Class. In addition to this areas such as special needs, working methods and the organisation of the learning process are stressed.
Methods will include:

- blended learning following the lines of the Pedagogical ICT Licence;
- workshops and traditional courses;
- innovation and production workshops with online periods.

Teachers actual competencies and tasks in using ICT

Below you will see a table of the coverage of the Pedagogical ICT Licences, October 2004

	In process	Total number	Completed	Course providers	Facilitators	Begun	Potential number	Coverage
Compulsory ed.	4,140	45,937	36,139	108	271	2-99	60,000	77%
Teacher training ed. 1		505	320	-	-	2-00	-	
Pre-school	477	3,250	1,747	49	51	1-01	8,000	41%
Language centres	98	1,270	1,104	2	5	1-01	1,500	85%
Health care ed.	193	675	445	4	10	2-01	1,000	68%
Upper secondary ed.	2,210	5,894	3,268	36	257	2-01	11,000	54%
Health care, further ed.	155	347	192	5	19	1-02	1,000	35%
Vocational ed.	314	573	259	19	41	1-02	6,000	10%
Teacher training ed. 2	458	528	70	12	42	1-03	800	66%
Teachers in pedagogical schools	51	51		5	13	1-04	800	6%

The themes of the Pedagogical ICT Licence for teachers in compulsory education cover the following areas (remember that all modules have both a pedagogical and an ICT-skills perspective):

Compulsory

- Internet
- Type a text
- Communication and collaboration
- School development and innovation

Optional (the team selects four modules)

- Pictures tell the story (image processing)
- It does its won calculations (spreadsheets)
- Tell it on the screen (presentations)
- Get it out on the net (web pages)
- Into the database (internal databases)
- The die is cast (simulations)
- Columns, layout, desktop publishing
- Learn it on the computer (educational software)
- It is easy on the computer (working methods)
- ICT as a compensatory tool
- Reading and ICT
- Games and ICT

TEACHER COMPETENCIES

A survey in the summer of 2003[3] showed how teachers themselves map their competencies. They state themselves that they are highly competent in the use of the word processor, in navigating the computer, in using the web, basic computer use and electronic communication. On the other hand they feel less accomplished in areas such as the use of web editors, in digitalisation of data and distance education.

3. Carried out by the statistics department UNI•C for the ICT-League summit 2003.

Lack of necessary competence
Digitalisation of data
Web editors
ICT supported distance education
Portfolio tools
Data collection/processing
Database tools
Assessment, coaching etc.
Data security/protection
Intellectual property rights
Learning strategies
Collaborative projects

Teachers were also asked to put priority to a number of themes for professional development of their fellow teachers. It was interesting to see how teachers prioritize the competencies that they themselves possess for professional development for their colleagues.

Most relevant competences
Basic computer concepts
Navigation on the computer
Word processing
Information on the web
Presentation tools
Electronic communication
Language tools
Educational services (web)
Project based learning
Process oriented writing
Handling digital content.

Problems that teachers face in using ICT in their practice

Generally, Danish schools are generally well equipped; especially the vocational schools have many computers. Almost all schools have Internet access (for reference to teachers' ICT competencies, see in previous paragraph.

EQUIPMENT IN SCHOOLS

	Students/PC	PCs with Internet access
Primary and lower secondary education (Folkeskole)	8,8 (10,8)	49%
Upper secondary education	6,29 (7,4)	91%
(Gymnasium and HF) Vocational colleges (incl. hhx/htx)	1,8 (2,1)	95%

Numbers cited are from 2000 (http://www.uvm.dk). Figures in parentheses indicate the ratio of students to PCs less than 5 years old. A survey[4] shows that 41% of the computers used for education are still in special computer rooms, 29% are in classrooms, 15% in school libraries and 9% in common/working areas. The number of computers in compulsory education is expected to rise considerably during the next two years as the new ministerial programme ICT in Compulsory Education offers 370 mio. DKK to schools as a one-to-one grant where the school can get a ministerial grant for the purchase of hardware if they spend an equivalent sum themselves.

4. *Undersøgelse af IT i folkeskolen.* (Examination of IT in the Folkeskole); Danish Ministry of Education, 2000 (See: http://www.f2000.dk/f2000a/f2000.nsf/Dokumenter/NT00003716?OpenDocument)

Teachers who had completed the Pedagogical ICT Licence before January 2001 were asked in May 2002 to state how their ICT used had changed after having participated and about their view on additional professional development. They stated that they clearly used ICT more both as a personal tool and integrated in the learning scenarios. Regarding continued professional development ICT they stated that they still feel a need for improving their ICT skills; two themes were mentioned for special focus: additional ICT skills and the use of educational resources.

PUPILS' ICT LICENCE

One of the initiatives of the latest ministerial ICT program is the Pupils' ICT Licence. This licence is a way to ensure that pupils posses relevant and adequate ICT skills and competencies. The description of the parameters of ICT skills and competencies are described in five main areas where the material for the project help the teachers to plan and monitor children's ICT development.

Pupils are assessed at three points during their compulsory education.

The parameters are:

- ICT skills
- Understanding
- Reflection

The main areas are:

- ICT- and media- supported learning processes
- Information collection
- Production and analysis
- Communication
- Computers and networks

The assessment is done through conversation, problem solving, digital portfolio, testing, process descriptions, assessment of media and ICT products and the everyday impression of the student's competence. See also http://www.junior-pc-koerekort.dk/

GENERAL ICT COMPETENCE IN THE DANISH SOCIETY

71% of Danish families have an Internet connection at home, more than half of these are 55% high-speed bandwidth. A total of 79% of the Danish population have access to the Internet either from their house or at work/in school. Thus the students in Danish schools have access and are generally familiar with the use of the computer.

In 2003 38% of the Danish population have bought goods or services on the Internet.

Content areas involved in teachers' competencies profile in ICT for education

THE PEDAGOGICAL ICT LICENCE

The Pedagogical ICT licence is in-service training for teachers combining pedagogical knowledge of ICT integration with basic ICT skills training. It follows the philosophy that when upgrading teachers one without the other makes the training useless.

The Pedagogical ICT licence is a course concept that offers teachers basic ICT skills on a personal and a professional level through focusing on the pedagogical integration of ICT in the teaching practice. The Pedagogical ICT Licence mentioned below is for in-service training of teachers in compulsory education. The Pedagogical ICT Licence was developed in Denmark, where it has been in operation since 1999. It was adopted by the Norwegian Ministry of Education in 2002 and it will be implemented in Italy, the Czech Republic, Greece and pilot tested in Ghana and Cameroon from September 2004. Negotiations with

Tasmania are pending at the moment. The implementation in Italy, Greece and the Czech Republic is supported by the European Commission's eContent programme. In Denmark more than 76% of teachers in compulsory education have participated in this course.

Characteristics of the Pedagogical ICT Licence

- All themes of the course have a pedagogical rationale. Participants work with ICT-skills related to these themes. No ICT without a pedagogical rationale.
- Course material inspires and offers ideas of how to teach about and with ICT.
- Participants work in teams where teachers together develop material and learning scenarios for use in their own daily praxis.
- The team is challenged pedagogically and ICT-wise through an online dialogue with their facilitator.
- Many teachers from the same school participate simultaneously. This means that information technology and its role in teaching, learning, collaboration and communication is on the school's pedagogical agenda.
- The course is distributed with regional or local providers to allow for large-scale implementation. Includes the following levels:
  - Secretariat
  - Course providers
  - Certified facilitators
- The duration of the course is 6–12 months.
- Module assignment/assessment is the documentation of a learning scenario that integrates ICT in a learning situation.
- A blended learning approach.
- The content is validated through an internally developed syllabus and internally developed course content.
- Module elements are: pedagogical content, ICT-skills exercises, ICT manuals, supplementary articles.

CONTENT AREAS OF THE PEDAGOGICAL ICT LICENCE

Objectives

- General knowledge of ICT and learning
- Media competencies

Contents

Each content area is defined both in terms of pedagogical competencies and in terms of ICT-skills. The content areas are:

- **The computer**
  General use of the computer, file management, security, etc.
- **Search and communication using the Internet**
  Information search and selection on the Internet. Different search methods are described. Information assessment and evaluation are also important themes.
- **Electronic communication**
  Electronic communication and collaboration on the net. The pedagogical theme is based on cooperation between students from different schools.
- **Word processing**
  Basic word processing is the ICT-skill element, whereas process-oriented writing pedagogy is to be described in relation to students in one's own class.
- **Layout**
  The power of a message depends heavily on the form of presentation. This is especially true for leaflets, brochures, posters etc. Applying some simple rules and tips can make a world of difference.

- **Digital images**
  Working with images on the computer, reading and interpreting images, awareness of image manipulation. Computer-based image processing is a theme of interest for both students and teachers. Participants learn to use the image processing program. Text layout is also an issue. Participants learn to present texts that are at the same time appealing and fitting the communicative context in which they appear.
- **Presentations**
  The computer can present information by means of a multimedia program or a presentation designer. The production of the presentation can be included in a pedagogical process where students gather material, plan and design screen images to fit a specific receiver.
- **The production of web pages**
  As webpages increasingly become a means of publishing, it is important that form and content speak the same language and that students as well as teachers know how to read and assess webpages.
- **Spreadsheets**
  The spreadsheet is a strong tool when it comes to working with figures. In maths education it can support an exploring and experimenting work method. In cross-curricular work the spreadsheet is an excellent tool for creation of diagrams. The spreadsheet is also excellent in developing the concept of modelling and simulation with students.
- **Internal databases**
  When information search is carried out via www it is important to know certain work methods in order to find the right information. The information is not only found via a search engine but also in databases. Here teachers get an overview of database concepts.
- **Using learning resources**
  Subject-specific software and websites. How do you use it, select it and evaluate it?
- **ICT and working methods**
  New working methods have been introduced in the school. How are these methods best utilized with ICT?
- **ICT and school innovation**
  Many things change in education these years. However, technology is not the main reason for this. The changes happen within thinking, learning and teaching. The processes of change is an indirect result of the integration of ICT in schools and society. Teachers must consider how ICT can be used in their place of work in the near future. Both in the pedagogical work and as a personal tool.
- **ICT as a compensatory and supportive tool**
  Teachers need to be aware of compensating technology and alternative ways of controlling the computer. Students with special needs may experience large educational and personal gains and opportunities in the use of ICT. ICT tools can support reading and writing processes, but also the customized set up of the computer and the office tools can hold pedagogical potential. Teachers also need to be aware of individual adjustments of software and ICT use that can support the student in the reading process. ICT also holds several possibilities for supporting reading skills: individual words and entire texts can be read out loud by means of digital or synthetic speech. If the text is not available in an electronic format, a scanner pen may be the solution.
- **Computer games in teaching and learning**
  Computer games offer the opportunity to develop both personal and subject specific competencies. Students rarely experience that their game competencies are highly valued in the classroom situation, but games may prove to be a break-through in the

hands of a creative teacher. Online games and games in networks offer communication, identification and absorption, creativity and learning. The games are most fun when played together with fellow students and thus hold a clear social perspective to be taken advantage of in special needs education. The integration of games in a particular learning scenario may prove an unexpected path to learning for the student.

For further information about the Pedagogical ICT Licence see www.epict.org

INFORMATION SHEET OF DENMARK

INITIAL TEACHER TRAINING SYSTEM

Typology of teacher	Educational level	Model of teacher training	Duration	National standard
Pre-primary	Pre-school class (age:6)	In order to be employed as a pre-school teacher (educator), the candidate must have completed the educator-training programme.		☒ Yes ☐ No
Primary	Primary and lower secondary school (*folkeskole*) (age: 7-16/17)	A candidate must have completed the *Folkeskole* teacher training programme at a college. Colleges are semi-autonomous educational institutions with their own curricula. A teacher is a profession bachelor.	4 years	☒ Yes ☐ No
Secondary	General upper secondary school (age:16/17-18/19)	In addition to the University degree, student teachers have to attend a professional postgraduate teacher training, the so-called *Paedagogikum*. *Paedagogikum* combines additional training in the second subject of the teacher, theoretical pedagogy and teaching practice.	University degree (5 years) + 2 years	☒ Yes ☐ No
Vocational	Vocational upper secondary education (age:16/17-18/19)	The teaching staff of the vocational colleges are characterised by a variety of different qualifications. The teachers of vocational subjects (2/3 of the approx. 9,000 teachers) will usually have a vocational qualification or the like plus five years or more of professional work experience in the subject they teach, and the teachers of more general subjects (1/3 of the teachers) will have a university degree in the subject they teach plus at least two years of relevant professional experience.	University degree (5 years)+ work experience	☒ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

In Denmark there is no centrally issued curricular framework for ICT in initial teacher training for teachers in primary and lower secondary education.
There is a general formulation of the integration of ICT stating that each teacher training college must define its own implementation of this curriculum.
Some teacher training colleges offer the **Pedagogical ICT Licence** (see below) as part of their initial training. The assessment procedure for initial teachers differs from that of in-service teachers, as the initial teachers must document their ICT-skills and pedagogical ICT competencies in a digital portfolio assembled throughout their teacher training. Apart from that the contents of the course material is the same, the subjects and the syllabus are the same, too.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☒ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

Danish teachers are free to participate in in-service training activities and, unlike many other EU countries, promotion is not conditional upon having taken part in in-service training activities.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

The Ministry of Education has supported the development of a series of **Pedagogical ICT Licences** for the in-service training of teachers in the pedagogical implementation of ICT. The Pedagogical ICT Licence was developed as a targeted, pedagogical alternative to the European Computer Driver
Licence (ECDL), which is not seen to meet the needs of educators. There is a total of 9 Pedagogical ICT Licences, each targeting a specific group of in-service teachers. The duration of the course is 6 – 12 months.
Each content area is defined both in terms of pedagogical competencies and in terms of ICT-skills.
The content areas are:

- · The computer
- · Search and communication using the Internet
- · Electronic communication
- · Word processing
- · Layout
- · Digital images
- · Presentations
- · The production of web pages
- · Spreadsheets
- · Internal databases
- · Using learning resources
- · ICT and working methods
- · ICT and school innovation
- · ICT as a compensatory and supportive tool
- · Computer games in teaching and learning

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☒ practice of the teacher operating in the knowledge society

Initial teacher education: objectives, subject areas and institutional courses

Arrangements for initial training of teachers vary according to the sector (schools, further education or higher education) in which they are intending to teach.

INITIAL TRAINING OF PRE-SCHOOL, PRIMARY AND SECONDARY SCHOOL TEACHERS

In England and Wales, teachers employed in maintained schools, including nursery schools, must have Qualified Teacher Status (QTS) or be otherwise licensed or authorised to teach by the Secretary of State for Education and Skills, the Teacher Training Agency, or the National Assembly for Wales. Teachers of a class of pupils with hearing or visual impairments must, in addition, obtain a recognised specialist qualification within three years of appointment.

Under the Teaching and Higher Education Act 1998, all teachers in maintained schools and non-maintained special schools are required to register with the General Teaching Council for England or the General Teaching Council for Wales. These Councils were established in September 2000.

Kate Watson
School of Education and Lifelong Learning, University of Exeter

Kate Watson has extensive experience in the field of ICT and e-learning with a specific focus on the teaching of ICT and its use in the classroom. This is an active research area within the school, with participation in the teaching of the course from throughout ICT team.

Initial teacher training (ITT) for school teachers has traditionally been provided by higher education institutions (HEIs), with students undertaking block periods of school-based experience known as teaching practice. Since 1983, all newly qualified teachers trained in England and Wales have had graduate status.

In recent years, the initial training of school teachers has undergone reform according to the following principles:

- there should be a variety of high-quality routes to Qualified Teacher Status (QTS), reflecting the different backgrounds and qualifications of candidates and responding to the increasingly diverse needs of schools;
- schools should play a much larger and more influential part in initial teacher training in partnership, where appropriate, with HEIs;
- accreditation criteria for institutions providing ITT should require HEIs, schools and students to focus on the competences of teaching, that is on the subject knowledge and skills required by newly qualified teachers, which equip them to teach effectively and are the foundation of further professional development; and
- institutions, rather than courses, should be accredited for ITT.

The trend towards placing students in schools for greater proportions of their training has resulted in a sharing of responsibility for ITT between the HEIs and the schools. Courses are now provided either by partnerships of HEIs and schools or, in a limited number of cases, by groups of schools, consulting HEIs and other agencies as required (see School Centred Initial Teacher Training.)

The first 'employment-based routes' into teaching began operation in around 1990 with the introduction of the Licensed and Articled Teacher schemes. These have since been discontinued, but other employment-based routes (notably the Graduate and Registered Teacher Programmes) are currently in operation. In recent years, in addition to employment-based routes, more flexible training programmes have been introduced which are designed to meet individual needs and circumstances.

The Teaching and Higher Education Act 1998 introduced significant reforms including:

- provision for the establishment of General Teaching Councils and the requirement for teachers to register with the appropriate Council;
- the requirement for Newly Qualified Teachers (NQTs) to serve an induction period;
- the inspection of teacher training institutions by Her Majesty's Chief Inspector (HMCI);
- the requirements for new headteachers to hold the professional qualification for headteachers.

The Teacher Training Agency (TTA) is an executive non-departmental public body established by the Education Act 1994. Its purpose is to raise standards in schools by attracting able and committed people to teaching and by improving the quality of teacher training.
The members of the TTA Board are appointed by the Secretary of State for Education and Skills.

DECISION-MAKING BODIES
The TTA has a statutory function to accredit and fund providers of ITT who can demonstrate that they will satisfy the Secretary of State's criteria for ITT. The TTA uses information about the quality and efficiency of provision, obtained from the Office for Standards in Education (Ofsted), TTA managed data collections and other sources to inform these functions. The Agency also works with providers to improve the quality of all routes into teaching, particularly by supporting the preparation of improvement plans following inspection of ITT. The Education Act 1994, as amended by the Teaching and Higher Education Act 1998, gives Her Majesty's Chief Inspector of Schools in England (HMCI) the power to inspect and report on any initial teacher training which is provided by a relevant institution. All inspections of ITT are conducted using the Framework for the Assessment of Quality and Standards in ITT, which was developed jointly by Ofsted and the TTA, following wide consultation.

INSTITUTIONS RESPONSIBLE FOR INITIAL TEACHER TRAINING OF SCHOOL TEACHERS
Higher education institutions (HEIs) in England and Wales whose initial teacher training provision satisfies criteria regarding quality and efficiency are accredited by the Teacher Training Agency (TTA) and the Higher Education Council – ELWa respectively, to offer programmes which lead to the award of Qualified Teacher Status (QTS). HEIs, with the involvement of their partner schools, have responsibility for course planning and management and for the recruitment, selection, training and assessment of students.
The requirements for the provision of initial teacher training (ITT) specify what providers of ITT must do. They are organised in four sections:
- trainee entry requirements;
- training and assessment;
- management of the ITT partnership and
- quality assurance.

Through their partnerships with HEIs, schools are also involved in planning ITT courses and recruiting candidates, and in teaching and assessing trainees.
School-Centred Initial Teacher Training (SCITT) is a school-based postgraduate programme for training teachers. SCITT was introduced under Section 12 of the Education Act 1994 and empowers schools or consortia of schools accredited by the Teacher Training Agency (TTA) to provide courses of initial teacher training. Schools take the lead in designing the training programme and can choose to work with a range of partners, including higher education institutions, Local Education Authorities (LEAs)

and others. Courses are available to those who hold a recognised university degree or equivalent, and lead to the Postgraduate Certificate in Education (PGCE) and to Qualified Teacher Status (QTS).

ADMISSION REQUIREMENTS TO INITIAL TEACHER TRAINING

Access to all initial teacher training courses is restricted and subject to a preliminary selection process, including an interview, to determine the applicant's suitability for teaching as a career.

Admission is also subject to physical and mental fitness to teach.

Institutions must also check that applicants do not have a criminal background which might prevent employment as a teacher with children or young people. Since 1989, it has been a requirement that experienced practising teachers are involved in the selection process.

All prospective teachers must be able to demonstrate that they have attained the standard required to achieve a Grade C in the General Certificate of Secondary Education (GCSE) (or equivalent) examination in English Language, Mathematics and, for primary courses, Science. Applicants for training according to concurrent training schemes must normally satisfy the criteria for university entrance. Applicants for consecutive training schemes must hold a recognised university degree or the equivalent. Applicants for employment-based routes through the Graduate and Registered Teacher Programmes must be over 24 years of age and have successfully completed either a first degree (for the Graduate Teacher Programme) or at least two years of relevant higher education (for the Registered Teacher Programme).

Some institutions in England offer Postgraduate Certificate in Education (PGCE) courses of two academic years' duration, which provide re-tutoring in certain subjects, as well as professional training. The courses are designed to enable graduates in a wide range of disciplines to train to be specialist teachers in the secondary age range, particularly in Design and Technology, Mathematics, Modern Foreign Languages and Science. For these courses, the content of the applicant's initial degree must normally include at least one year of full-time higher education study or equivalent relevant to the appropriate subject specialism.

CURRICULUM AND CONTENT OF INITIAL TEACHER TRAINING

The content of training courses and the minimum period of practical and teaching experience in schools are specified in broad terms by the Government. Institutions are accredited by the Teacher Training Agency. The detailed organisation of training courses is decided by the individual institution.

From September 2002, the standards and requirements for courses of initial teacher training have been revised. The new arrangements are set out in the document Qualifying to Teach (DfES and TTA, 2002) and replace the requirements of DfEE Circular 4/98. The new standards and requirements set out:

- the standards set by the Secretary of State which must be met by trainee teachers before they can be awarded Qualified Teacher Status (QTS) and
- the requirements for training providers and those who make recommendations for the award of Qualified Teacher Status.

The new standards for the award of Qualified Teacher Status are 'outcome statements' that set out what a trainee teacher must know, understand and be able to do to be awarded QTS. They are organised in three interrelated sections which describe the criteria for the award.

- Professional values and practice: these standards outline the attitudes and commitment to be expected of anyone qualifying to be a teacher, and are derived from the Professional Code of the General Teaching Council for England.

- Knowledge and understanding: these standards require newly qualified teachers to be confident and authoritative in the subjects they teach and to have a clear understanding of how all pupils should progress and what teachers should expect them to achieve.
- Teaching: these standards relate to skills of planning, monitoring and assessment, and teaching and class management. They are underpinned by the values and knowledge covered in the first two sections.

The standards apply to all trainee teachers, whatever route they take to QTS. They do not set a curriculum but include a clear statement of professional values and practice. The requirements do not specify how training should be organised or run, but allow providers of initial teacher training greater autonomy and flexibility in the design and delivery of training provision to enable them to respond to an individual trainee teacher's needs.

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

ICT forms an important part of many aspects of teachers' work in schools and, in order to be awarded Qualified Teacher Status, trainee teachers in England are required to demonstrate that they know how to use ICT effectively, both to teach their subject and to support their wider professional role, for example to complete pupils' records of progress, prepare resources for pupils and to assist with administrative tasks.

TRAINING MODELS AND DURATION OF TRAINING

The main routes to Qualified Teacher Status (QTS) in England and Wales are via the concurrent or the consecutive route. Employment-based training is increasingly common.

Concurrent model

Most programmes following the concurrent model are for primary teaching, but there are also some programmes aimed at secondary teaching.

The concurrent degree is generally organised in an integrated pattern, comprising a mixture of higher education subject studies, theoretical classes and practical teaching activities throughout the period of study. The degree normally involves three or four years of combined full-time higher education and teacher training, leading to an education degree and to Qualified Teacher Status (QTS). The qualifications awarded on successful completion of the course include the Bachelor of Education (BEd) and the Bachelor of Arts or Bachelor of Science in Education (BA(Ed) or BSc(Ed)), although other names may be used. The course includes curriculum, pedagogical and educational studies; university-level study of one or more main subject(s); and the application of the students' main subject(s) in primary or secondary schools, as appropriate. Two-year concurrent degree courses are available for mature students who have already completed at least one year of relevant higher education. Some courses are available part-time.

The standards and requirements for initial teacher training (ITT) (DfES & TTA, 2002) require ITT providers to ensure that trainee teachers spend at least the following length of time being trained in schools, recognising that a trainee's former experience of working with pupils may count towards these totals:

- 32 weeks for all four-year undergraduate programmes;
- 24 weeks for all two- and three-year undergraduate programmes.

Each trainee teacher must have experience in at least two schools. Time in schools may be completed on a part-time basis to make up the full-time equivalent amounts above. Teaching in settings other than schools may also count towards these totals, provided that they enable trainee teachers to work towards the achievement of the standards for the award of Qualified Teacher Status.

Consecutive model

Traditionally, programmes following the consecutive model are for secondary teaching, but consecutive programmes for primary teaching are increasingly popular.

The consecutive training model involves three or four years of study leading to a first degree, followed by one year of professional training leading to the Postgraduate Certificate in Education (PGCE). Courses may be full-time or part-time, with full-time courses lasting one year. The PGCE focuses on curriculum (the National Curriculum or specialised subjects), pedagogical and educational studies, practical teaching skills and the application of the students' degree subject(s) to school teaching.

The standards and requirements for initial teacher training (DfES & TTA, 2002) require providers of PGCE courses to ensure that trainee teachers spend at least the following length of time being trained in schools, recognising that a trainee's former experience of working with pupils may count towards these totals:

- 24 weeks for all secondary and key stage two or three postgraduate programmes;
- 18 weeks for all primary postgraduate programmes.

Similarly to the concurrent route, trainee teachers must have experience in at least two schools, and time in schools may be completed on a part-time basis to make up the full-time equivalent amounts. Teaching in settings other than schools may also count towards the totals, provided that this enables trainee teachers to work towards the achievement of the standards for the award of Qualified Teacher Status (QTS).

EMPLOYMENT-BASED TRAINING

The Graduate Teacher Programme (GTP) and Registered Teacher Programme (RTP) are aimed at trainees over the age of 24 and were introduced at the beginning of 1998. The programmes enable schools to employ teachers who are not yet qualified and to support them through an individual training programme leading to Qualified Teacher Status (QTS). Responsibility for the administration of the programmes lies with the Teacher Training Agency (TTA). Trainees must first find employment in a school and are paid as unqualified teachers. The school is responsible for assessing training needs and devising and overseeing the training plan, which is approved by the TTA and may include off-site training.

Since September 2000, schools involved in the Graduate Teacher Programme (GTP) can benefit from grants paid by the TTA to cover the salary costs of their trainees. A limited number of places on the Programme are available each term. These are allocated to the best schools and best graduate trainees in priority recruitment areas and in shortage subjects. The TTA also pays an additional grant to cover the training and assessment costs of trainees. All maintained schools, non-maintained special schools and city technology colleges (CTCs) are eligible for both salary and training grants. GTP trainees follow a postgraduate programme which normally lasts one year. However, for those with significant teaching experience, this may be reduced to a minimum period of three months. Up to 90 per cent of the trainee's time may be spent teaching but this may vary depending on the provider.

Trainees on the Registered Teacher Programme (RTP) must have successfully completed two years of full-time higher education (or the part-time equivalent) and spend up to two years working and training as a teacher while they complete a degree. The minimum period of training is one year. Training and assessment costs are met by the TTA but schools are responsible for the payment of salaries. A limited number of places are available on the programme but these are not restricted to teaching a particular phase of education or specific subjects. All maintained schools, non-maintained special schools and CTCs are eligible for training grants.

INDUCTION

The Teaching and Higher Education Act 1998 introduced arrangements to provide all newly qualified teachers (NQTs) with a period of monitoring and support during their first year in the profession. Since May 1999, all newly qualified teachers in England have been required to serve an induction period of three school terms. The induction period must be satisfactorily completed to nationally set standards. Information on the arrangements for the completion of the induction period for those who wish to work in a maintained school or non-maintained special school is contained in DfES Guidance 582/2001. The document provides details of the professional standards which all NQTs are expected to reach, and sets out guidance on how NQTs should be monitored, supported and assessed during the induction period. Qualified Teacher Status (QTS) is still awarded on successful completion of initial teacher training (ITT). However, NQTs who are awarded QTS and who do not satisfactorily complete a statutory induction period are not eligible to continue employment as a teacher in a maintained school.

The induction period combines an individualised programme of support, which provides opportunities for NQTs to develop further their knowledge, skills and achievements in relation to the standards for the award of QTS, with an assessment of their performance. It takes account of the NQT's strengths and areas for development as set out in the Career Entry Profile which each NQT brings from initial teacher training to their first teaching post. NQTs should have a timetable of no more than 90 per cent of normal average teaching time during the induction period. Headteachers have a duty to ensure that NQTs' teaching time does not exceed 90 per cent of the average teaching time.

EVALUATION AND CERTIFICATION

Students are currently supervised and assessed by tutors from the Higher Education Institution (HEI) where they have studied and by senior teachers in the schools where they undertake their practical experience. Students are assessed against all the standards for the award of Qualified Teacher Status (QTS). Teachers are partly responsible for assessing the students' competence to teach their specialist subject, to assess pupils and to manage classes. Assessment may include examinations and continuous assessment during the course.

Students following a concurrent course who satisfy these and any other specified criteria normally receive the award of QTS and a Bachelor of Education (BEd) or Bachelor of Arts or Bachelor of Science in Education degree (BA (Ed) or BSc (Ed)). Graduates of the shortened concurrent degree course are usually awarded the Bachelor of Education (BEd) degree.

The Postgraduate Certificate in Education (PGCE) and QTS is awarded to those who have successfully completed:

- a one-year full-time or a two-year part-time course of postgraduate initial teacher training; or
- a School-Centred Initial Teacher Training (SCITT) course, if it is validated by a university for the award of a PGCE.

Since May 2002, all trainees in England have been required to pass skills tests in numeracy, literacy and information and communication technology in order to achieve QTS. Computerised tests in numeracy and literacy were introduced in February 2001 and tests in information and communication technology (ICT) skills began in September 2001. All trainees are required to pass these skills tests before they can obtain QTS, register with the General Teaching Council (GTC) and begin their induction period. The tests cover the core skills teachers need to fulfil their wider professional role in schools, rather than the subject knowledge required for teaching. The tests must be taken by all

new entrants into the teaching profession regardless of the training route followed. A teacher trainee who has satisfied all the specified standards required of a person who seeks to become a qualified teacher, except that he/she has yet to pass the skills tests, may be employed as an unqualified teacher for an aggregate period of five years or longer period, if approved by the Secretary of State.

ALTERNATIVE TRAINING PATHWAYS

In England, flexible modular courses leading to a Postgraduate Certificate in Education (PGCE) and the award of Qualified Teacher Status (QTS) are available. Such courses are designed to meet the individual needs and circumstances of trainees. Programmes start and finish at different points in the year to allow maximum flexibility and may involve part-time, full-time, distance or weekend learning. As with other training routes, practical classroom experience is a core requirement of such courses. The length of the course may be shortened for those with experience of teaching, for example at an independent school or overseas.

The centrally managed 'Fast Track Programme' run by the Department for Education and Skills (DfES) provides certain teachers with rapid career progression. Fast Track is an individually-tailored professional development programme targeted at future leaders in education. Trainees undertake a one-year full-time enhanced PGCE course provided by selected initial teacher training institutions.

Curricular framework of ICT for education in initial training

THE CONTEXT OF THE ICT PROGRAMME

In England and Wales the ICT element of the ITE programme is centrally determined. The government require ITE programmes to follow a set of standards and requirements: Qualifying to Teach Professional Standards for Qualified Teacher Status and Requirements for Initial Teacher Training [the QTT Standards]. ICT is therefore embedded in the QTT Standards for all student teachers. ICT is the focus of two of the QTT Standards:

S2.5 Those awarded Qualified Teacher Status must demonstrate they know how to use ICT effectively, both to teach their subject and to support their wider professional role.

S3.3.10 Those awarded Qualified Teacher Status must demonstrate they use ICT effectively in their teaching.

Beyond this, expected competencies are not listed. Previous government requirements in force before September 2002 listed expected competencies in some detail. The QTT Standards came into force in September 2002, so they have applied to all ITE for 2 years. All students are expected to be capable ICT teachers within their own subject as required by the QTT Standards. A number of institutions offer ITE subject/phase courses which embed the ICT within the curriculum.

Some training providers also offer ICT as a subject qualification such as a Secondary PGCE in ICT that qualifies students to teach ICT in schools to young people aged 11-18 years. The specialist PGCE group is trained to be able to teach ICT as a subject in its own right, including public examination courses such as GCSE (General Certificate in Secondary Education) and Advanced Level. This programme lasts for one academic year. Some have been running for just one year. Others have been running for longer.

The University of Exeter Secondary ICT PGCE course has a quota of 20 out of a total of 400 Secondary PGCE places. Thus, the specialist subject is 5% of the total training cohort in any one year.

With regard to evaluation, all ITE is subject to regular inspections by Ofsted (Office for Standards in Education), a government body. Currently, Ofsted inspections are run on a 3-year cycle. Individual Teacher Education Institutions are required to carry out their own annual evaluations of each training course. Instruments used include feedback from students and partner schools, tutor assessment of the course, tutors' peer assessment of teaching quality and assessment by external examiners.
The academic results of the students are not evaluated. The PGCE is awarded on a final pass/fail basis, although assignments during the course are marked. There is generally no evaluation of students' abilities to use ICT equipment nor of students' commitment to the use of ICT in the classroom. To that extent there is no evaluation of return on investment.

THE AIMS/PURPOSES OF THE ICT PROGRAMME
The following information relates to the specialist ICT training programme. The programme aims are made explicit in the course handbooks. In particular, emphasis is placed on the role of the teacher in bringing about pedagogical, curriculum and school organisational change and promotes the idea of a community of practice among teachers. The course aims to go beyond technical mastery and is embedded in a wider socio-cultural environment.

THE CONTENT OF THE ICT PROGRAMME
Included in the programme are elements which deal with pedagogical paradigms, the role of teacher, collaborative learning, the concept of a community of practice, curriculum change and innovation, motivating pupils, differentiation and the special needs of learners.

THE PEDAGOGY OF THE ICT PROGRAMME
A constructivist, collaborative pedagogical stance is explicit and evident. Differentiation is employed. Cognitive mastery is encouraged.

ASSESSMENT OF THE ICT PROGRAMME
Students complete written assignments during the course and are assessed during school-based work against a list of competencies based on the QTT Standards. The assessment is carried out by university tutors and teachers in schools who have been trained by the university as ITT tutors/mentors.
University written assignments are completed each term. The assessment of school-based work is continuous and progressive throughout the two school placements from January until the beginning of July. Two formative progress reports are sent to the university at the end of January and March. A final summative report with a 'pass' or 'fail' decision is completed at the end of June.
The assessment of school-based work is strongly constructivist.
With regard to cognitive mastery, the written assignments require this. To some extent, the final achievement of the QTT Standards requires it.

How initial teacher training is carried out

The training approach for the PGCE ICT course is highly collaborative. During the university term, students work mostly in seminar groups or workshops, supporting each other's learning. Some peer teaching is used to address subject knowledge gaps by making use of expertise brought to the course by individual students. Individual needs analysis followed by individual action plans are used to structure and monitor the training, with university tutors in a central supporting role.

ICT tools are used throughout the course, including resources posted on the web and the use of e-mail for communications as well as submission of work to tutors. WebCT is supported by the University of Exeter for use in distance learning. This is particularly valuable when students are dispersed into partnership schools throughout the southwest region for school-based work.
During the ICT course a range of applications is used by the students, including subject-specific resources such as datalogging (science) or CAD/CAM (design and technology).

In service teacher training: objectives, subject areas and bodies

Arrangements for the continuing professional development of teachers vary according to the sector (schools, further education or higher education) in which they teach.

PRE-SCHOOL, PRIMARY AND SECONDARY EDUCATION

All teachers have a professional duty to review their methods of teaching and programmes of work, and to participate in arrangements for their in-service training or continuing professional development (CPD) as teachers. Professional development can cover a broad variety of activities ranging from ad hoc working groups of teachers in schools to courses undertaken at higher education institutions, sometimes leading to academic awards.
From the 1970s onwards it began to be accepted that a teacher's initial qualification was not sufficient for a whole career. This led to a major increase in in-service training (INSET) opportunities for teachers, provided by local education authorities (LEAs) and/or by teacher training institutions, with teachers being released in school time to undertake that training.
From the late 1970s to the present day these opportunities have increased, have become increasingly more targeted and formalised, and their funding has moved from the LEA to the control of the Secretary of State. This control is exercised through the allocation of funds, via the Standards Fund in England LEAs and now, increasingly, to schools.
Schools choose the providers of the training but must use the funds for the training as specified by the Secretary of State. This has enabled the Secretary of State to ensure that training activities are provided to match new curricular requirements, for example the introduction of a literacy programme for key stage 3 pupils in England.
Following consultation, the Government has published a new strategy for the continuing professional development (CPD) of teachers in England (DfEE, 2001). The strategy aims to give teachers increased opportunities for relevant, focused, effective professional development, and to give professional development a key role in school improvement. In this context, professional development is taken to mean any activity that increases the skills, knowledge or understanding of teachers, and their effectiveness in schools. A Code of Practice for providers of publicly funded professional development training for teachers has also been developed.
As part of the CPD strategy, and following advice from the General Teaching Council for England, the Government is providing funding for a pilot programme of early professional development for teachers in England in their second and third years of teaching, building on the induction year.

INSTITUTIONS RESPONSIBLE FOR CONTINUING PROFESSIONAL DEVELOPMENT

Continuing professional development (CPD) may be provided within a school, at a local education authority (LEA) or Education and Library Board (Board) teachers' centre, at a

higher education institution (HEI) or a further education institution, or at an independent training or conference centre in England, Wales, Northern Ireland or overseas. Trainers include a wide range of agencies and individuals: HEIs, school staff, LEA/Board advisory teachers, advisers and inspectors and independent consultants. In Northern Ireland, the Regional Training Unit, established by the Education and Library Boards, also provides continuing professional development for teachers and lecturers. The British Council Education and Training Group is the main government agency responsible for managing programmes of study visits and development courses for teachers in Europe and elsewhere.

ADMISSION REQUIREMENTS

Teachers may take part in continuing professional development (CPD) at any time in their career. Access to CPD depends on the nature of the activities. For example, while all teachers may be involved in 'whole-school' professional development activities, some may require training in a specific discipline or aspect relative to their individual role or responsibility. At the other end of the continuum, teachers applying to undertake courses leading to a higher degree or academic diploma are subject to the admissions criteria of the higher education institution (HEI) and the course concerned. Specific training requirements for teachers may be identified through the appraisal process.

COURSES, CURRICULUM AND DURATION OF STUDIES

Although participation in training and professional development is one of the specific professional duties of teachers, there is no legal minimum requirement stated for the length of time to be spent on such activity. Participation depends on the professional needs of the teacher concerned and the availability of the resources in the school to meet them. It can range from a few hours to several days and sometimes full- or part-time studies over an extended period, in preparation for nationally recognised qualifications. Courses may be held during school hours, in 'twilight' sessions after school or at weekends or during holidays.

Each school determines its own continuing professional development (CPD) needs, within the broad framework provided by the Government's specific grant provisions. These may range from support for individual members of staff arising from performance management interviews, through training for groups of staff to deal with curricular or management changes, to whole-school development.

The term CPD covers a wide range of staff development activities. It may refer to a teachers' working group within a particular school, or a series of meetings or conferences which bring together teachers from a number of schools. It can include activities such as team-teaching or industrial placement or work shadowing. Individual teachers may undertake professional development in the form of study for a higher qualification, such as an advanced diploma or a higher degree (such as a Master's degree or a doctorate). It also includes the headship programmes.

NATIONAL STANDARDS

A framework of national standards has been developed which sets out the standards of practice that teachers should expect to demonstrate at particular points of their career and makes suggestions for supporting development activity. It is intended that the framework should support career planning, performance management and enable development activity to be targeted in recognition of the individual teacher's needs and aspirations. The national standards set out the professional knowledge, understanding, skills and attributes necessary to carry out effectively the key tasks of that role. The standards

emphasise national priorities, particularly in support of the Government's key educational targets in relation to literacy, numeracy and information and communication technology.

Curricular framework of ICT for education in in-service teacher training

THE CONTEXT OF THE ICT PROGRAMME

ICT training has been available for all teachers funded by the New Opportunities Fund (Lottery-derived funding). The nature of the training depends on the individual provider. Other in-service courses are offered by different training providers. There is a wide variety of courses available. Many are short, one-day courses. At the other end of the scale, Masters or PhD qualification opportunities are available.

Schools and/or teachers may select the training that best suits their individual needs, whether this be a specific programme or embedded in curriculum studies.

NOF training in England started in April 1999, to run over 3 years up to 2002. The government aim is that all teachers should be 'confident and competent users of ICT' by 2002. It is hard to find any figures that support this!

There is no standard evaluation instrument used to evaluate CPD courses in ICT. Short courses will be evaluated on the basis of student feedback. Longer, higher level courses will be evaluated in various ways. Ofsted evaluates some in-service training courses, but not all of them.

THE AIMS/PURPOSES OF THE ICT PROGRAMME

The aims and purposes of ICT programmes, as well as the content and pedagogical stance will depend on the nature of the training and the provider who is offering it. There is no national standard for in-service training.

How in-service teacher training is carried out

The above depends very much on the course. Any in-service training for ICT is almost certain to use ICT tools. We run Masters level courses at the university of Exeter that are delivered completely on-line. Most courses use some or all face-to-face delivery. Increasingly ICT is being used for communications with teachers as schools are increasingly using the Internet, including e-mail.

The aim of the government is to have all schools colleges, libraries and universities connected to the Internet so that they can make use of the developing National Grid for Learning to access resources, information and support for all areas of teaching and learning (Target date, 2002).

Teachers actual competencies and tasks in using ICT

Teachers' confidence and competence in the use of ICT in the classroom is variable, but from my observations while visiting a large number of schools across this region over the past 4 years, I would say that ICT use in teaching and learning in schools is increasing.

One reason for this is that all trainee teachers are now trained to be competent and confident in the use of ICT for teaching and learning in their own subjects. This expertise is being rolled out into schools as the newly qualified teachers move into their first jobs. Established teachers are increasingly using ICT in the classroom. Practice is uneven, but is developing. The New Opportunities Fund [NOF] training and improved provision of

hardware and software has had some impact. From 2001, each school in England has been given government grants in the form of 'electronic learning credits' that can be used to purchase multimedia resources according to local needs.
A wide range of applications is used in English schools, but there is little standardisation as teachers can choose which software they purchase. The government initiative to provide teachers with laptops has also had a beneficial effect on the use of ICT in the classroom as it allows teachers take the computer home to familiarise themselves with software and to prepare materials and resources away from the pressures of the school environment.

Problems that teachers face in using ICTin their practice

In practice, established teachers may lack the confidence to use ICT for teaching as they may feel a loss of control if they are not very familiar with the software. Technical problems also discourage some: if the network is not working well it can be very difficult to manage an ICT-based lesson. Wise teachers prepare a paper-based alternative, but this takes time to do. There may be financial problems with maintaining and upgrading equipment in some schools that operate on a tight budget. As home computer ownership increases, some children bring a high level of expertise into the classroom and teachers may need to adapt their style of teaching to accommodate this. Peer instruction and support can be very valuable, but it needs managing well.
It takes time to learn how to use new software or computer-related equipment such as digital video cameras and teachers may feel that they do not have enough time to do this, which will tend to restrict innovative uses of ICT for teaching and learning.
Many newly qualified teachers are taking high levels of expertise and enthusiasm for the use of ICT into the classroom, which they are ready to share with established colleagues. This helps to support the use of ICT in the classroom in some cases.

Content areas involved in teachers' competence profile in ICT for education

Here you should produce a list of broad topics related to teachers' competence in ICT for education. You can derive them in one of following ways:
1) from main national teachers' training initiatives and programs,
2) from initial training courses, or
3) from your experience as an expert involved in the field.

KNOWLEDGE AND UNDERSTANDING
Those awarded Qualified Teacher Status must demonstrate all of the following:
2.1 They have a secure knowledge and understanding of the subject(s)* they are trained to teach. For those qualifying to teach secondary pupils this knowledge and understanding should be at a standard equivalent to degree level.
In relation to specific phases, this includes:
a. For the Foundation Stage, they know and understand the aims, principles, six areas of learning and early learning goals described in the QCA/DfEE Curriculum Guidance for the Foundation Stage and, for Reception children, the frameworks, methods and expectations set out in the National Numeracy and Literacy Strategies.
b. For Key Stage 1 and/or 2, they know and understand the curriculum for each of the National Curriculum core subjects, and the frameworks, methods and expectations set out in the National Literacy and Numeracy Strategies. They have sufficient understanding of a range of work across the following subjects:

- History or Geography
- Physical Education
- ICT
- Art and Design or Design and Technology
- Performing Arts and
- Religious Education

to be able to teach them in the age range for which they are trained, with advice from an experienced colleague where necessary.

c. For Key Stage 3, they know and understand the relevant National Curriculum Programme(s) of study, and for those qualifying to teach one or more of the core subjects, the relevant frameworks, methods and expectations set out in the National Strategy for Key Stage 3. All those qualifying to teach a subject at Key Stage 3 know and understand the cross-curricular expectations of the National Curriculum and are familiar with the guidance set out in the National Strategy for Key Stage 3.

d. For Key Stage 4 and post 16, they are aware of the pathways for progression through the 14-19 phase in school, college and work-based settings. They are familiar with the Key Skills as specified by QCA and the national qualifications framework, and they know the progression within and from their own subject and the range of qualifications to which their subject contributes. They understand how courses are combined in students' curricula.

2.2 They know and understand the values, aims and purposes and the General Teaching Requirements set out in the National Curriculum Handbook. As relevant to the age range they are trained to teach, they are familiar with the Programme of Study for Citizenship and the National Curriculum Framework for Personal, Social and Health Education**.

2.3 They are aware of expectations, typical curricula and teaching arrangements in the Key Stages or phases before and after the ones they are trained to teach.

2.4 They understand how pupils' learning can be affected by their physical, intellectual, linguistic, social, cultural and emotional development.

2.5 They know how to use ICT effectively, both to teach their subject and to support their wider professional role.

2.6 They understand their responsibilities under the SEN Code of Practice, and know how to seek advice from specialists on less common types of special educational needs.

2.7 They know a range of strategies to promote good behaviour and establish a purposeful learning environment.

2.8 They have passed the Qualified Teacher Status skills tests in numeracy, literacy and ICT.

* *The Foundation Stage is organised into six areas of learning rather than into subjects. Throughout this document, references to 'subjects' include these areas of learning.*

** *For Key Stage 1 and/or 2 the National Curriculum Framework for Personal, Social and Health Education includes Citizenship.*

3.3 Teaching and class management.

Those awarded Qualified Teacher Status must demonstrate all of the following:

3.3.1 They have high expectations of pupils and build successful relationships, centred on teaching and learning. They establish a purposeful learning environment where diversity is valued and where pupils feel secure and confident.

3.3.2 They can teach the required or expected knowledge, understanding and skills

relevant to the curriculum for pupils in the age range for which they are trained. In relation to specific phases:

a. those qualifying to teach Foundation Stage children teach all six areas of learning outlined in the QCA/DfEE Curriculum Guidance for the Foundation Stage and, for Reception children, the objectives in the National Literacy and Numeracy Strategy frameworks competently and independently;
b. those qualifying to teach pupils in Key Stage 1 and/or 2 teach the core subjects (English, including the National Literacy Strategy, mathematics through the National Numeracy Strategy, and science) competently and independently.
They also teach, for either Key Stage 1 or Key Stage 2, a range of work across the following subjects: History or Geography, Physical Education, ICT, Art and Design or Design and Technology, and Performing Arts, independently, with advice from an experienced colleague where appropriate;
c. those qualifying to teach Key Stage 3 pupils teach their specialist subject(s) competently and independently using the National Curriculum Programmes of Study for Key Stage 3 and the relevant national frameworks and schemes of work. Those qualifying to teach the core subjects or ICT at Key Stage 3 use the relevant frameworks, methods and expectations set out in the National Strategy for Key Stage 3. All those qualifying to teach a subject at Key Stage 3 must be able to use the cross-curricular elements, such as literacy and numeracy, set out in the National Strategy for Key Stage 3, in their teaching, as appropriate to their specialist subject;
d. those qualifying to teach Key Stage 4 and post-16 pupils teach their specialist subject(s) competently and independently using, as relevant to the subject and age range, the National Curriculum Programmes of Study and related schemes of work, or programmes specified for national qualifications*. They also provide opportunities for pupils to develop the key skills specified by QCA.

3.3.3 They teach clearly structured lessons or sequences of work which interest and motivate pupils and which:
- make learning objectives clear to pupils
- employ interactive teaching methods and collaborative group work
- promote active and independent learning that enables pupils to think for themselves, and to plan and manage their own learning.

3.3.4 They differentiate their teaching to meet the needs of pupils, including the more able and those with special educational needs. They may have guidance from an experienced teacher where appropriate.

3.3.5 They are able to support those who are learning English as an additional language, with the help of an experienced teacher where appropriate.

3.3.6 They take account of the varying interests, experiences and achievements of boys and girls, and pupils from different cultural and ethnic groups, to help pupils make good progress.

3.3.7 They organise and manage teaching and learning time effectively.

3.3.8 They organise and manage the physical teaching space, tools, materials, texts and other resources safely and effectively with the help of support staff where appropriate.

3.3.9 They set high expectations for pupils' behaviour and establish a clear framework for classroom discipline to anticipate and manage pupils' behaviour constructively, and promote self-control and independence.

3.3.10 They use ICT effectively in their teaching.

3.3.11 They can take responsibility for teaching a class or classes over a sustained and

substantial period of time. They are able to teach across the age and ability range for which they are trained.

3.3.12 They can provide homework and other out-of-class work which consolidates and extends work carried out in the class and encourages pupils to learn independently.

3.3.13 They work collaboratively with specialist teachers and other colleagues and, with the help of an experienced teacher as appropriate, manage the work of teaching assistants or other adults to enhance pupils' learning.

3.3.14 They recognise and respond effectively to equal opportunities issues as they arise in the classroom, including by challenging stereotyped views, and by challenging bullying or harassment, following relevant policies and procedures.

*This could include work-related learning.

INFORMATION SHEET OF ENGLAND

	Typology of teacher	Educational level	Model of teacher training	Duration	National standard
INITIAL TEACHER TRAINING SYSTEM	*Pre-primary*	Foundation stage/nursery schools (3-5)	*For all level teachers*: newly qualified teachers trained in England and Wales have graduate status. Higher Education Institutions (HEIs) in England and Wales whose initial teacher training provision satisfies criteria of quality and efficiency, are accredited by the Teacher Training Agency (TTA) and by the Higher Education Council, to offer programmes which lead to the award of Qualified Teacher Status (QTS). Responsibility for initial training is shared between HEIs and schools.		☒ Yes ☐ No
	Primary	Primary (5-11)	Most programmes for primary teaching follow the concurrent model: the concurrent degree is generally organised in an integrated pattern, comprising a mixture of higher education subject studies, theoretical classes and practical teaching activities throughout the period of study.	3-4 years	☒ Yes ☐ No
	Secondary	Post-primary/ secondary schools (11-18)	Most programmes for secondary teaching follow the consecutive model: a first degree followed by one year of professional training leading to the Postgraduate Certificate in Education (PGCE).	3-4 years (first degree) + 1 year (post-graduate)	☒ Yes ☐ No
	Vocational	Lower sec. vocational (11-14) Upper sec. vocational (16-18)			☒ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

The government requires initial training programs to follow a set of standards. ICT is embedded in these standards for all student teachers: those awarded Qualified Teacher Status must demonstrate they know how to use ICT effectively, both to teach their subject and to support their wider professional role. Moreover these teachers must demonstrate they use ICT effectively in their teaching. Beyond this, expected competencies are not listed.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☐ digital literacy
- ☒ specific subject
- ☐ use in classroom
- ☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

All teachers have a professional duty to review their methods of teaching and programmes of work, and to participate in arrangements for their in-service training or Continuing Professional Development (CPD) as teachers. Professional development can cover a broad variety of activities ranging from ad hoc working groups of teachers in schools to courses undertaken at Higher Education Institutions, sometimes leading to academic awards.

CPD may be provided within a school, at a Local Education Authority (LEA) or Education and Library Board teachers' centre, at a higher education institution (HEI) or a further education institution, or at an independent training centre.

Teachers may take part in Continuing Professional Development (CPD) at any time in their career. Participation depends on the professional needs of the teacher concerned and the availability of the resources in the school to meet them. It can range from a few hours to several days and sometimes full- or part-time studies over an extended period, in preparation for nationally recognised qualifications.

A framework of national standards has been developed which sets out the standards of practice that teachers should expect to demonstrate at particular points of their career. The standards emphasize national priorities, particularly in support of the Government's key educational targets in relation to literacy, numeracy and information and communication technology.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

ICT training has been available for all teachers funded by the New Opportunities Fund (Lottery-derived funding). The nature of the training depends on the individual provider; there is no national standard for in-service training.

Other in-service courses are offered by different training providers. There is a wide variety of courses available. Many are short, one-day courses. At the other end of the scale, Masters or PhD qualification opportunities are available.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☐ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher who operating in the knowledge society

Remarks Focus of in-service training pertaining to ICT depends on the course and the provider.

Initial teacher training: objectives, subject areas and institutional courses

The initial teacher training in Finland is arranged by universities and vocational teacher training institutes at the polytechnics. At general educational institutions, instruction may be given by:

- *class teachers*, who mainly provide instruction for forms 1–6 in basic education, teaching all subjects, and who may also give pre-school education;
- *kindergarten teachers*, who may give pre-school education in separate pre-school classes;
- *subject teachers*, who teach one or several subjects in basic education (primarily in forms 7–9) and/or in general upper secondary education and who may also work at liberal adult education institutions and as teachers of core subjects in vocational institutions;
- *special needs teachers and special class teachers*, who may provide instruction for children in need of special education;
- *pupil counsellors and student counsellors*, who may offer educational guidance in basic education and in general upper secondary education.

Teaching staff at vocational institutions and polytechnics may include:

- teachers of core subjects;
- teachers of vocational studies;
- teachers providing special education;
- student counsellors.

Jouni Kangasniemi
Senior Adviser, Ministry of Education

Jouni Kangasniemi is currently working for the Finnish Ministry of Education. He is the chairman of a working group preparing the national guidelines for in-service training of teachers. He has also been involved in the development of the Finnish Programme for Education, Training and Research in the Information Society. Currently he is one of the secretaries for the executive group for the programme.

Students in class teacher education take the higher academic degree (240 credits, ECTS), i.e. the Master's degree, with education as their main subject. According to the relevant decree, students must be provided with the opportunity to complete a Master's degree in the space of five academic years. Class teacher education consists of basic, subject and advanced studies in education, subsidiary subject studies and teaching practice. Class teachers may provide instruction in all subjects in forms 1–6. They may specialise in teaching one or several subjects in their subsidiary subject studies. Completion of an extensive course in a subsidiary subject (studies in the teaching subject of at least 52 credits ECTS included in subject teacher education) will also give eligibility for functioning as a subject teacher in basic education. The Master's degree in class teacher education consists of the following study modules:

- language and communication studies;
- basic and subject studies in education;
- advanced studies in education;
- subsidiary subject studies;
- optional studies;
- pro gradu - research work.

Students in kindergarten teacher education complete the lower academic degree, namely the Bachelor of Education degree consisting of 180 credits (ECTS). The degree may be completed in three academic years. The majority of the graduated kindergarten teachers work in day-care centres as teachers and educators of children under school age. Studies in kindergarten teacher education consist of the following study modules:

- language and communication studies;
- basic and subject studies in education;

- studies providing professional skills needed in early childhood education and care and pre-school education;
- subsidiary subject studies;
- optional studies.

The subject teacher's degree is a higher academic degree with a scope of 240 or 270 credits (ECTS) and it may be completed in 5–6 years. Students aiming to become subject teachers study in accordance with the subject teacher programme in the faculty of their main subject. The education is organised so that the faculties' subject departments are responsible for providing instruction in the relevant subject, whereas the department of teacher education is responsible for organising their studies in education. These studies are completed at the same time and in interaction with each other. Subject teacher education includes 52,5 credits (ECTS) of pedagogical studies.

People with a higher academic degree may complete separate pedagogical studies for teachers with a scope of 52,5 credits within a teacher education unit. The unit may decide on the extent, to which the individuals' previous studies and teaching experience are to compensate for some studies. Subject teacher education provides wide-ranging teacher qualifications for basic education and general upper secondary school as well as qualifications to teach general subjects at vocational institutions and liberal adult education institutions. At some universities, students may specialise in adult or vocational education and training in their pedagogical studies.

Since 1995 it has been possible to take a Bachelor of Education (180 credits, ECTS) or Master of Education (240 credits, ECTS) degree with special pedagogy as the main subject. *Special needs teacher* studies of 52,5-75 credits, ECTS can be included into the degree of Master of Education or completed as separate studies after taking the degree.

People with a higher academic degree are entitled to apply for separate *student counsellor studies*. In student counsellor education leading to a Master's degree, the main subject is an educational subject. Pedagogical studies for teachers may be included in the main subject or completed separately. In addition, the education includes student counsellor studies with a scope of 52,5 credits ECTS.

Teachers of core subjects at vocational institutions and polytechnics have the same education as subject teachers working within the general education sector.

Teachers of vocational subjects are required to have an appropriate higher academic (Master's) degree or an appropriate polytechnic degree or, if such do not exist, the highest possible qualification in their own occupational field. In addition, they must complete pedagogical studies with a scope of 52,5 credits ECTS and have at least three years of work experience in the field. The studies include basic studies in education, vocational subject pedagogic studies, teaching practice and other studies.

Students may complete the education in one academic year by studying full-time or flexibly as multiform education in 1 to 3 years and link their studies to the development of their own teaching methods and the working environment of the institution.

Vocational teacher training institutes offer special needs teacher education with a scope of 35 credits, which qualifies teachers to work as special needs teachers at vocational institutions. Most special needs teachers work at vocational special institutions.

Vocational teacher training institutes organise student counsellor education with a scope of 52,5 credits ECTS, which qualifies teachers to work as student counsellors at vocational institutions.

Initial teacher training: curricular framework of ICT for education

Teacher training in Finland is arranged by universities (8/20) and vocational teacher training institutes at the polytechnics.

Pre-school teachers get a bachelor's degree in educational science, the extent of which is 120 credits (180 ECTS). This degree qualifies to serve as a kindergarten teacher and as a pre-school teacher. There are some optional ICT courses to choose from. All students are expected to learn the basic use of ICT by the time they graduate.
Classroom teachers get a master's degree in educational science (160 credits/240 ECTS). This degree qualifies to serve as a classroom teacher and as a pre-school teacher. The compulsory education in Finland lasts nine years, from the age of 7 to the age of 16. Classroom teachers may specialise in Media education or in Educational use of ICT. The optional subsidiary studies may be included into their degree. All class teacher students are expected to learn the basic use of computers by the time they graduate. It is also possible to complete the pedagogic studies using virtual methods in education itself.
Subject teachers get a Master's degree, the extent of which is 160 credits/240 ECTS. There are two possibilities to get in to the subject teacher education. The more common way is to start studying the subject at the university first and then later the pedagogical studies. After these pedagogical studies one is qualified to teach the subject in question. The other way is to apply directly to the subject teacher education. This direct selection to teacher education is getting more common, but so far it is only possible in few subjects. All subject teacher students are expected to learn the basic use of ICT by the time they graduate.
Special-education teachers get a Master's degree in educational science (160 credits/240 ECTS). This degree qualifies to serve as a special-education teacher in compulsory education and as a classroom teacher.
Vocational school teachers as a rule get a degree at a university or at a vocational institute at a higher education, then they work for a few years, and after that they do the pedagogical studies (35 credits/52,5 ECTS) at a vocational teacher training institute at a polytechnic to serve as a qualified teacher. The vocational teacher institutes have arranged all the studies so that educational platforms are in frequent use during the studies and teachers are familiar with the ICT by the time they complete their studies.
In general, teachers must feel safe with computers and other relevant technologies, in order to use IT in their own instruction. However, this provides the basis for working. Learning how to utilise IT independently always contains two phases: one has to learn to use the technical tools reasonably fluently and, on the other hand, one has to learn to envisage how one's own tasks can be carried out better and more easily using these new tools.
In class teacher education and subject teacher education the students may choose to study educational use of ICT as a subsidiary subject with the scope of 22,5 credits ECTS.
The studies consist of the following study modules:
- understanding pedagogical methodology and related learning theories in the field of using ICT in education;
- perspectives to media- and networks cultures;
- use of ICT in education, mastering its tools and technologies;
- research in the field of educational use of ICT;
- optional modules;
- project studies.

The studies are planned in the network of eight universities hosting a faculty of education.
The studies are planned as a part of activities encouraged by the Finnish virtual university, e.g. networks between the academic disciplines. It is also possible to study Media Education with the scope of 22,5 and 52,5 credits ECTS. The subsidiary studies are organised by the University of Helsinki, department for teacher education.
The programme on Media education focuses on the theoretical and practical significance of media education in the various fields of society and its different applications in

teaching, studies, work, communication and in general in the versatile information management. The main objective is to combine the theory and research having didactic, educational and communicative emphases with practical activities and teaching in particular. The studies are partly arranged by means of telematic devices (electronic mail, computer conferencing, World Wide Web, video conferencing).

How ICT related topics in initial teacher training is carried out

ICT is widely regarded at the Department of Teacher Education and at the Vocational Teacher Training Institutions as part of the core of education alongside traditional literacy. In addition to the traditional education, students may take several short courses and even subsidiary courses on ICT in education specialising or broadening their general knowledge on the topic.

The Finnish Virtual University supports a project called KasVi (The National Virtual University Project of the Faculties of Education of Eight Finnish Universities). The overall objective of KasVi is to find new innovative and virtual modes of co-operation in the field of teacher education and information and communication technologies.

In-service teacher training: objectives, subject areas and bodies

There is no specific legislation governing continuing teacher education and training. The obligation to participate in in-service training is partly defined in various statutes and partly in collective agreements. Teachers are obligated to participate in in-service training for three or five days a year according to the relevant statutes and collective agreements. Teachers have the right to participate in this obligatory training with full salary benefits. On the other hand, employers have the right to assign all full-time teachers to training. Employers also decide which training programmes and forms of education can be accepted as in-service training conforming to the collective agreement.

Continuing education and training have been divided into the following forms on the basis of the responsible decision-making bodies:

- *Self-motivated continuing teacher education*. Teachers have the responsibility and power of decision for participating in the education and they may receive support from society in the form of various study grants. Teachers especially favour continuing education that helps them update their professional knowledge in their own subject or field of vocational education and training. Recently, long-term (even 40-credit) Professional Development (PD) programmes completed along with work have become more popular. The employer decides on the participation in education during working hours.
- *In-service training at educational institutions*, which is the responsibility of the maintaining body of the institution. The primary legal responsibility for in-service teacher training rests with the maintaining body of the educational institution, usually the local authority. The maintaining bodies also receive state support for training costs within the framework of state subsidy. The aim is that the maintaining bodies of educational institutions use at least 1% of their salary expenditure on teaching staff for in-service training.
- *Education that is important in terms of education policy*. The State, primarily the Ministry of Education, is responsible for controlling and financing this education. This type of education promotes the practical implementation of the objectives defined in Parliament and Government decisions and in the target outcome negotiations between the Ministry of Education and the National Board of Education. The Ministry of Education drew up a development programme for teacher training in 2001. The programme lists current and important topics in continuing teacher education and

training. These are developing the use of ICT in education, subject and field-specific knowledge and skills, special needs pedagogy, immigrant education, co-operation with working life as well as developing management skills and schools as work communities. The aim is to ensure that teachers working in different part of the country and different institutions get sufficient and equal opportunities for professional development.

Continuing teacher education is organised by state-owned training centres, university continuing education units, vocational teacher education colleges, university departments of teacher education, teacher training schools, summer universities and various private organisations. Continuing education is largely based on the logic of supply and demand. As supply exceeds demand, organisations offering training have to compete on the price and quality of education.

In cases when the training is financed or supervised by the National Board of Education, the National Board defines the objectives and contents of the programme. Furthermore it evaluates the outcome of the objectives. In most cases, education providers decide on the topics, duration and time of education independently. Continuing education may be pedagogical, subject-related or connected with a specialisation area. Education may, for example, familiarise teachers with general changes in education policy and society. Recently, the focus has been on themes related to curricular reform, assessment and evaluation, new technologies, multiculturalism and internationalisation.

To date, most continuing teacher education has been short-term training to maintain professional skills. A common characteristic of continuing education for different teacher groups is that all groups favour education that helps them update their professional knowledge and command of their own subject or field of vocational education and training.

On the other hand, teachers' interest in education that improves their qualifications on the labour market and leads to degrees or to the completion of university study modules has increased. So far, only a very small amount of the education available can be directly included in study modules or degrees. Some providers of continuing teacher education, however, have started to develop cumulative long-term programmes, which combine various continuing education periods and may lead to additional qualifications on the labour market. In the future, teacher education will most likely be based more and more on a more individual learning programme. Studies can thus be constructed on the basis of individual career plans and teachers can flexibly supplement their studies at a later stage.

In-service teacher training: curricular framework of ICT for education

The principles underpinning the teaching profession are listed in the teacher education development programme by the Ministry of Education. Development as a teacher must be seen as a gradual process of studies, teaching and continuing professional education. The changes in the teaching profession necessitate up-to-date and constantly developing teaching skills. Teachers themselves must be willing to renew and to assume responsibility for developing their own work. For the educational institution, it is important that the staff development is carefully planned and linked to institutional development. This requires individual and institutional training plans and the possibility of requiring that teachers develop their own professional skills. It is important for the educational institutions to develop a plan or a strategy how to use and utilise ICT in education. Such a document is required from all the institutions. The aim was set in the National Information Society Strategy for Education, Training and Research 2000-2004.

Important partners in future learning environments will be experts, business enterprises and organisations, as well as students and teachers in other educational institutions. The

learning community will increasingly be virtual and teaching will be partly given via information networks. The opportunities inherent in ICT must not, however, alone determine the course of education, which must have a solid basis in pedagogy. Technology makes it possible to use several different learning methods and to differentiate contents, which will allow learners' different needs and learning capacities to be taken into account. This requires varied learning support and guidance.
As planned, the educational use of ICT forms part of all teachers' initial and in-service training. In addition to important technical and pedagogical modules there also needs to be included ethical and social points of view. The training arrangements in the professional development of teachers in particular must take account that as regards the educational use of ICT institutional development is a communal learning process.
The government has funded a program to improve the educational ICT skills of all teachers. The training is organised in three levels of competencies: basic skills, use of ICT in education skills and advanced ICT skills.
The first level covers the basic mastering of ICT tools. It is extremely important for the equal standards in teaching and for personal use of ICT in education.
The second level covers the pedagogical and technical level needed by the schools and networks of schools. The education at this phase addresses the different needs of education along with the deepening and diversification of pedagogical use.
The third level covers the advance use of ICT in school and in broader contexts. The in-service training will facilitate the revision of development strategies and curricula in the educational establishment. The educational use of ICT in institutional development is a communal learning process and requires a broad participation to training with colleagues.

How in-service teacher training is carried out

Use of ICT in in-service training of teachers is actively encouraged in Finland. Educational use of ICT should form part of all teachers' further training if it is organised outside the school and is intended for longer study modules. Since continuing education centres organising in-service training for teachers play a very central role in the further education of teachers, their influence on the future development of the educational use of ICT could easily multiply.
The general level of ICT infrastructure in Finland is good. In many schools and continuing training organisations it can even be characterized as excellent. In practice almost every teacher while participating in-service training or working, can have access to computer that is hooked up to a network. However, every time ICT is used in education (in-service training), the use of it should be pedagogically justified.

Teachers actual competencies and tasks in using ICT

The Statistics Finland is responsible for collecting statistics concerning the use of ICT in education and Technical infrastructure. The statistics are not collected from the teachers themselves unless they reply as general citizens in general surveys. The main study is conducted by the Statistics Finland every two years. The report *"The Finns and the Future Information Society"* provides a full account from its first year in 1996 through to 2002. Additional annual statistics are collected annually.
The following statistics are collected concerning education:

- PC and Internet use in schools in 1996-2002
- Proportion using information technology
- Access to PC and the Internet at school
- How IT skills are learned

- What aspects of information technology have been studied at school during 2002
- IT uses at school during autumn 2002
- Media Technology use at school
- Information technology in class
- ICT use at school: trends in development.

Problems that teachers face in using ICT in their practice

The greatest obstacle to the use of new technological applications is the availability of workstations for students and teachers themselves. This is an especially significant problem if the computers are available in a computer class or other premises reserved for the computers. The number of students per computer is approximately 9 students/computer in general education in Finland. In vocational education and in higher education the ratio is much more favourable. There is also a lack of knowledge in using computers. The number of teachers not knowing how to use computers/possessing the basic skills has decreased steadily, thanks to the availability and regular use of computers in everyday school life.

Lack of suitable hardware makes it sometimes impossible to practice new skills. On the other hand, lack of guidance available for the teachers and lack of time are also a clear evident.

Teachers have too few opportunities to produce and look for useful learning materials.

Content areas involved in teachers' competencies profile in ICT for education

EXAMPLE 1 Media Education 15 credits (22,5 ECTS)
(University of Helsinki, Department of Education)

The programme focuses on using media education and information and communication technologies in teaching, studying, work-life, communication and information management. Media education is analysed from the perspective of didactics, its social significance and practical applications. The studies are partly completed by means of e-mail, groupware tools, network-based education and video conferencing.

1. **Basic skills and knowledge of media education, 3 credit (4,5 ECTS)**
   Participants are expected to have the basic skills of information and communication technologies (word processing, e-mail, and working on the net).
2. **Basic knowledge and skills of communication and education, 4 credits (8 ECTS)**
   Students majoring in Education (educational sciences) complete basic knowledge and *skills of communication* (4 credits/6 ECTS), and students majoring in Communication studies complete *basic knowledge and skills of education* (4 credits/6 ECTS). Other students may choose one of the units.
   A introduction to communication, 4 credits (6 ECTS)
   2.1 *Introduction to communication 2 credits (3 ECTS)*
   Student will become acquainted with the basic concepts and approaches of communication.
   2.2 *Media analys, 2 credits (3 ECTS)*
   Students will develop a critical ability to approach media texts. Different products of mass communication will be analysed, by using central theories and methods of media research.
   B basic knowledge and skill of education, 4 credits (6 ECTS)
   2.3 *Learning, education and educational philosophy - 4 credits (6 ECTS)*
   Students choose courses totalling 4 credits (6 ECTS) among basic studies in Education. This may be a 2-credit or 4-credit course.

Two of the following courses:

2.3.1 *Introduction to educational philosophy 2 credits (Basic course 1)*

2.3.2 *Education and society 2 credits (Basic course 2)*

2.3.3 *Psychological basis for learning 2 credits (Basic course 3)*

2.3.4 *Education in life cycle 4 credits (Basic course 6)*

or

2.3.1 *Introduction to educational philosophy, 2 credits (3 ECTS) (Basic course 1)*

Aims: Students will become familiar with philosophical conceptualisation of educational phenomena.

2.3.2 *Education and society, 2 credits (3 ECTS) (Basic course 2)*

Aims: Students will study the development and educational policies in the Finnish education system.

2.3.3 *Psychological basis for learning, 2 credits (3 ECTS) (Basic course 3)*

Aims: Students will become familiar with the regularities of the development of learning and personality from the point of view of lifelong learning.

2.3.4 *Education in life cycle, 4 credits (6 ECTS) (Basic course 6)*

Aims: Students will acquaint themselves with education and training at the different stages of one's life both in formal and informal learning environments.

3. Optional courses, 4 credits (6 ECTS)

Students choose two courses out of the following application areas of information and communication technologies. Students become familiar with software, complete exercises and assess existing material. The literature is approved by the teacher of each course. Courses are evaluated on a scale 1-3/fail.

3.1 *Distance teaching and open and distance learning, 2 credits (3 ECTS)*

Aims: Students will become acquainted with the didactics and tools (such as video conferencing) used in distance teaching and open and distance learning.

3.2 *The use of information and communication networks, 2 credits (3 ECTS)*

Aims: Students will plan and produce Web pages and use data banks, newsgroups and network-based learning materials in a versatile way.

3.3 *Hyper and multimedia, 2 credits (3 ECTS)*

Aims: The course focuses on the didactic aspects of hypermedia and multimedia. Students will become familiar with the principles of hypertextual communication and study the didactic use of hypertextual applications, including an authoring system.

3.4 *Graphics and digital image editing, 2 credits (4 ECTS)*

Aims: Students upgrade their competence in drawing software, digital image editing and graphic software.

3.5 *Video and editing, 2 credits (3 ECTS)*

Aims: The course focuses on video as part of the continuum of audio-visual narration and its use in teaching. Students become familiar with planning, filming and digital editing of video programmes.

4. Advanced studies, 4 credits (6 ECTS)

Students may take part in advanced studies only after completion of basic skills and knowledge of media education (3 credits/6 ECTS).

Students plan a didactic or communicative application related to the field of media education. The theme may consist of a distance education study module, a didactic analysis of network-based materials, planning and implementing a hypermedia document, producing a multimedia presentation, a follow-up and a thematic analysis of newsgroups, planning and implementing a digital video programme or planning a Web course.

INFORMATION SHEET OF FINLAND

	Typology of teacher	Educational level	Model of teacher training	Duration	National standard
INITIAL TEACHER TRAINING SYSTEM	*Pre-primary*	Preschool (6-7)	lower academic degree (BEd)	3 years	☒ Yes ☐ No
	Primary	*Class teacher*: Basic education (7-13)	Class teacher education takes the higher academic degree, i.e. the Master's degree. Education consists of basic, subject, advanced studies in education and teaching practice. Class teachers may provide instruction in all subjects, but may specialise in teaching one or several subjects.	5 years	☒ Yes ☐ No
		Subject teacher: Basic education (14-16)	See below		
	Secondary	*Subject teacher*: Upper secondary (16-19)	An higher academic degree is required. Students study in the faculty of their main subject. Faculties' subject departments provide instruction in the relevant subject, whereas the department of teacher education organises studies in education. Otherwise people that already held a degree may complete separate pedagogical studies.	5-6 years	☒ Yes ☐ No
	Vocational	Vocational education (16-19)	Teachers of *core subjects* require same education as subject teachers. - Teachers of *vocational subjects* are required to have an higher academic (Master's) degree or an appropriate polytechnic degree. In addition, they must complete pedagogical studies and have at least three years of work experience in the field.	5 years + 3 years of work in the field+ Teacher qualification 1 year	☒ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

In general, teachers must feel safe with computers and other relevant technologies, in order to use IT in their own instruction. All categories of teacher are expected to learn the basic use of ICT by the time they graduate.

Learning how to utilise IT independently always contains two phases: one has to learn to use the technical tools reasonably fluently and, on the other hand, one has to learn to envisage how one's own tasks can be carried out better using these new tools.

In *class teacher* education and *subject teacher* education the students may choose to study educational use of ICT as a subsidiary subject.

The studies consist of the following study modules:

- Understanding pedagogical methodology and related learning theories in the field of using ICT in education
- Perspectives to media- and networks cultures
- Use of ICT in education, mastering its tools and technologies
- Research in the field of educational use of ICT
- project studies

The studies are planned in the network of eight universities hosting a faculty of education.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☐ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☒ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

There is no specific legislation governing continuing teacher education and training. Teachers are obligated to participate in in-service training for three or five days a year according to the relevant statutes and collective agreements. Continuing education and training have been divided into the following forms on the basis of the responsible decision-making bodies:

- Self-motivated continuing teacher education. Teachers have the responsibility and power of decision for participating in the education and they may receive support from society in the form of various study grants
- In-service training at educational institutions, which is the responsibility of the maintaining body of the institution
- Education that is important in terms of education policy. The State, primarily the Ministry of Education, is responsible for controlling and financing this education. The Ministry of Education drew up a development programme for teacher training in 2001.

Continuing teacher education is organised by state-owned training centres, universities, vocational teacher education colleges, teacher training schools and various private organisations. In most cases, education providers decide on the topics, duration and time of education independently.

In the future, teacher education will most likely be based more and more on a more individual learning programme. Studies can thus be constructed on the basis of individual career plans and teachers can flexibly supplement their studies at a later stage.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

It is important for the educational institutions to develop a plan or a strategy on how to use ICT in education. The aim was set in the *National Information Society Strategy for Education, Training and Research 2000-2004*.

The educational use of ICT forms part of all teachers' initial and in-service training. In addition to important technical and pedagogical modules there also needs to be included ethical and social points of view.

The government has funded a program to improve the educational ICT skills of all teachers. The training is organised in three levels of competencies: basic skills, use of ICT in education skills and advanced ICT skills.

The first level covers the basic mastering of ICT tools. It is extremely important for the equal standards in teaching and for personal use of ICT in education.

The second level covers the pedagogical and technical level needed at organisational level and in teachers educational work. The education at this phase addresses the different needs of education along with the deepening and diversification of pedagogical use.

The third level covers the advance use of ICT in school and in broader contexts.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☐ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☒ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

Initial teacher training is being organized since the beginning of the 1990 in IUFMs (*Instituts Universitaires de Formation de Maîtres* - University institutes of teacher training), that have replaced the institutions so far in charge of training teachers. There are 31 IUFM, 1 one for each *académie*. In 2002-2003, IUFM roughly had 89 000 students.

Candidates apply after having earned a bachelor degree and their preparation lasts two years. At the end of the first year, students sit for a competitive examination, where the number of open positions corresponds to a national planning of teaching needs in the future years. The first year is therefore designed to prepare for the competitive examination. Independent candidates may sit to this exam without having been inscribed in a IUFM.

Students who pass the competitive examination become paid interns (*stagiaires*) and follow a second year of professional training, teaching part time under the supervision of a mentor. At the end of the second year, they undergo an evaluation of their teaching, which is not very selective. After completing it, they become civil servants of the state and have tenure.

Georges-Louis Baron
Laboratoire EDA, Université René Descartes

Georges-Louis Baron is professor of education at the French Institute for Pedagogical Research (INRP), where he has been in charge of a research department. He has been working on ICT in education for many years, with a special interest in the study of social contexts.

If all teachers are now trained in the same institutions and are supposed to receive some form of common training, the situation is not quite the same regarding primary and secondary education: primary teachers are polyvalent, while secondary teachers either teach only one subject (or a group of subjects considered as related, e.g. History and Geography, Physical Science and Chemistry, etc.) in general education, while some vocational education teachers are bivalent. There are currently three main types of secondary teachers. Qualified (*certifiés*) and vocational education teachers (*professeurs de lycée professionnel*) represent a majority of teachers. There is also a third category, *agrégés*. Representing around 12.5% of the total number of secondary teachers, they receive a better salary and have less teaching duties. They are recruited by a very selective competitive examination organized in a variety of subjects, *agrégation*. Those who have passed it represent a majority of the 17% of second degree teachers teaching in higher education. Candidates generally prepare this competitive examination at the university, or in a higher normal school (*Écoles normales supérieures*). Those who pass the competitive examination follow the second year of UFM.

What should be the aim, content and validation of training in IUFM is written in official texts. The current one, renovating instructions made public in the beginning of the nineties, has been published in 2002. It insists on the fact that teacher education is simultaneously adult, vocational and university education and stresses the importance of training reflexive practitioners.

It provides instructions for the second year of training, concerning teaching experience (both in full responsibility and accompanied), courses and the elaboration of a vocational dissertation, based on the analysis of their practice, which must be defended at the end of the year.

If the text gives general principles and expresses several times the opportunity of organising training sessions common to primary and secondary education, the two levels are dealt with in specific sections. For example, concerning primary education, the text insists on the importance of fundamental learning for children (among which language has the top priority) and insists on the importance of teachers' polyvalence (future teachers will have to

teach every subject). It demands that each trainee have a major subject among foreign languages, arts and sport education, plus complementary training in the other subjects, among which mathematics and science. The teaching experience in full responsibility should last nine weeks, in three sessions. For all second degree teachers, a teaching experience in responsibility during the whole year (under the supervision of a mentor) is the central element of the training. Teachers of technical and vocational education also have to follow an internship in an enterprise. Other learning activities include complementary courses about the subject matter, analysis of practice and personal work.

Initial teacher training: curricular framework of ICT for education

Before coming to the point, two recent innovations launched in the French context should be mentioned, because they have consequences on ICT usage: the creation of assistant educators helping teachers with their everyday work and a new form of ICT certification (B2I and C2I).

ASSISTANT EDUCATORS

During the academic year 1997-98, the government, mainly in order to decrease the rates of unemployment among young people, created a category of temporary positions (for a maximum of five years) called *emplois jeune*s (youngsters' jobs). In the field of education, these positions were called *aides éducateurs* (assistant educators). So, 30% of primary schools (representing more than a half of the overall number of pupils) have had an average of two such junior people. Their duty is to assist teachers for various activities, including ICT. Studies realised so far suggest that, where assistant educators are present, ICT usage progresses considerably. Qualitative studies made in INRP hinted that, in some cases, teachers even in fact tended to off-load onto them the responsibility of initiating pupils to ICT (Harrari, 2004).

SPECIFIC ICT COMPETENCIES: B2I AND C2I

In 2000, the French ministry in charge of education created for students a certificate for Informatics and the Internet (B2I – *Brevet Informatique et Internet*), with initially two main degrees: at the end of both primary and lower secondary education. A third level, concerning senior secondary education has later been experimented. Like the European Computer Driving Licence (ECDL), B2I lists a series of necessary competencies that are to be acquired at the end of each level. But contrary to ECDL, it is not mainly aimed at certifying skills for employers; it is rather intended to give teachers and parents signals about what is expected from students and can be considered, in a way, as a lever for facilitating ICT infusion: teachers are encouraged to implement situations allowing students to acquire and show their ICT competencies. B2I is to be managed in every school by teachers and official grids have been published to that effect. This poses a problem, however. If all studies show that a majority of teachers use computers at home on an everyday basis, the situation changes when it comes to using ICT in the presence of students. It appears that, except in some subjects where teachers have received a specific ICT education during their university studies (e.g. Technology, Science, etc.), many are not comfortable enough with the competencies that are expected from students and, more important, to underlying concepts. So the implementation of B2I is rather slow and difficult (Devauchelle, 2004). A new scheme was therefore adopted in 2002, aiming at creating another certification, specially designed for teachers: certificat Informatique et Internet, C2I, still under experimentation. This certificate aims at *"developing, reinforcing and validating the mastery of ICT for students of higher education"* and has two levels. The first one aims at assessing "core competencies" in ICT and the second wants to cover the assessment of professional competencies.

According to recent official texts, teachers should soon be obliged to validate the first level of C2I before being tenured. This certificate is not a teaching scheme, even if preparing it requires some sort of courses. Current official texts estimate the amount of training needed at bachelor level to 8 ECTS (out of 180). Like B2I, C2I is organized in great fields (e.g. for level 1: information retrieval and management, data processing, saving and archiving of data, presentation of data in presence and at a distance, distant exchange and communication, production in the context of collaborative work, awareness of issues and stakes related to using ICT). The actual implementation of C2I is still embryonic and its impact cannot be yet evaluated. However, its development may have significant impacts on the acquisition of ICT competencies by teachers.

ICT IN IUFM IN GENERAL

Regarding ICT, IUFM have in the past played a rather important role regarding ICT and programs have been launched rather early, aiming at giving teachers a sufficient familiarity with ICT (e.g. Baron & Bruillard, 1994), generally in the field of "general training". The evolution, since the beginning of the 1990, has however been toward the integration of ICT training within the existing subject matters and a decreasing importance of specific ICT courses. The national text reorganizing the second year of training quoted above mentions explicitly ICT only 4 times in more than 11000 words. It refers six times to information and communication technology in the broad sense, never as a priority and rather vaguely: about the use of resources in personal work, the use of ICT tools by interns, the need to sensitize trainees to the impacts of living in an information society, the need to demonstrate in submitted work the use of ICT. For secondary teachers there is also an item about integrating the use of ICT in their professional practice.

For primary teachers, a 15 hours module is to be organized: *"learning to master the teacher 'tools': the body, the voice, the technological tools"*. For secondary teachers, priority is given to disciplinary training.

The main idea is that what can be learned within the subject matters and in the practicum will suffice to cover most of the needs. This trend, partially linked with the trivialization of informatics leaves open issues linked with the necessary competencies that teachers must have acquired to effectively use technology in their classroom and to comply with the needs of B2I. What has been actually organized in the IUFM has not yet been surveyed. One can however think that, on the whole, this text is applied even if, according to specific priorities, differences may exist.

France is therefore in a rather paradoxical situation where official dispositions do exist and where what should be attained regarding ICT has been rather well specified. But, at the same time, IUFM have currently rather limited means to insure ICT education and no curricular framework has been defined regarding ICT as such. The C2I innovation may bring noticeable changes, but it is difficult to predict now what its impact is going to be in the future years.

ICT IN THE DIFFERENT SUBJECT MATTERS

The infusion of ICT in the different curricula is rather variable. The amount of teacher training in ICT is highly correlated with the integration of ICT instruments in the subject matters teachers will have to teach and to the correlative presence (or absence) of ICT in the corresponding syllabi. This integration is thus complete in the different technical subjects (e.g. using 3D modelling software for mechanical engineering, using databases in management studies, etc.). There also is, at junior secondary level, a special course named *Technologie*, that has a special responsibility toward the education of students regarding information technology, and therefore where student teachers receive a special training in ICT (Lebeaume & Martinand, 1999). Sciences also currently use computer aided

experimentation in labwork and also use digital data (e.g. in the field of biology). To some extent, Mathematics use spreadsheets and algebra systems as well as software like Cabri Geometre in Geometry. All these classes of software are present to some extent in the disciplinary dimension of initial teacher training. But there is no fixed curriculum. Last but not least, *documentation* presents an interesting case. *Centres de Documentation et d'Information* (similar to resource centers) have been in existence for a long time. But personnel in charge of them, school librarians, have only been considered as teachers (with the creation of a specific national competitive examination only in 1989). If they have a recognized mission and a responsibility over a specific place (the documentation center), they do not benefit from specific time slots in students' schedules. Documentation teachers are now recognized as having a special responsibility for teaching students information retrieval and management literacy. Their training is organized in consequence and a part of the teachers-librarians' competitive examination entails information retrieval on the Internet.

How initial teacher training is carried out

It is worth noting that there are signs of a rising interest for the use of new modalities of teacher education. Some IUFM have begun to implement new forms of distance learning using the Internet and even new forms of collaborative preservice training using case based studies (Baron & al., 2001b). But implementing those new forms of training cannot be considered generalized and poses problems of its own, in particular because the constraints of initial teacher training are strong and the stakes high (students have to pass a competitive exam at the end of the first year and a certification at the end of the second).

It is worth mentioning that the assembly of IUFM directors launched an operation named TUTELEC aiming at providing with on line resources and mentorship candidate primary teachers having not quite passed the competitive exam and doing a practicum (TUTELEC, 2002). However, results of this operations have not yet been published.

In-service teacher training: objectives, subject areas and bodies

Participation in continuing education is a right for French teachers. A majority of them undertake this and almost all those applying for it receive at least one training period in the school year. Training activities chosen by teachers are supported by the administration, mainly in the form of paid educational leave or release from duty. The actions of professional development have been decentralized since the beginning of the nineteen eighties. Continuing education of first and second degree teachers is organised repectively by the departments and the academies. At the national level, a national training plan (PNF) mainly aims at defining priorities and at training trainers at the other levels. The offer of training (included in the three years contracts academies have with the national level) varies according to the académies, even if all actions make a reference to national orientations. We'll give here only two examples.

The 2004 training plan of Marseille, in Provence, refers in its foreword to the Recteur's two principles regarding training: accompany staff in the mutations and evolutions of the educational system; see that training be the tool for adapting the professionality of staff. It presents the stakes for the 2004-2007 period and identifies three great axis for 2004-2005: *"implement the priority orientations of the educational policy"* (four goals and 16 operations, among which teaching foreign languages, the prevention and management of conflicts); *"accompany staff in their professionalization"* (two goals and seven actions, among which *"generalize the pedagogical usage of ICT"*); *"reinforce the performances of piloting and managing the public service of education"* (two goals and six actions).

The similar plan in Paris also mentions three main axis regarding: disciplinary

orientations; training in interdisciplinary and transversal domains; training for the management of human resources. Concerning disciplinary orientations, eight priorities are given (beginning with the mastery of mother tongue and the prevention of illiteracy), among which the teaching of foreign languages (priority 2). ICT is briefly mentioned in priority 7, among other didactic and pedagogic priorities. Concerning interdisciplinary orientations, seven points are mentioned, with a focus on migrant children and education action zones, none of them concerning ICT.

PRIMARY EDUCATION

As has been said, continuing education, is based on a catalogue (the academic training plan), designed for accompanying schools, teaching and education teams, and also for individual teachers. Situations do vary according to academies. We'll only give here the two examples taken from the documents quoted above.

In the Paris *Académie*, the academic training plan mentioned in 2004 - 2005 three priorities for primary education: the mastery of French language, the generalization of foreign languages and science teaching.

In the *Académie* of Marseille, the Recteur has set two main goals for primary education, that are:

1. to guide the next three year plan: implement training actions complementary between the departments and the académie, in order to facilitate the communication between people of different departments and to improve mutualisation of training resources.
2. to achieve the reinvestment of national training actions and the transfer of the resources they produce.

Overall, what is perhaps the most noticeable is that: 1) on account of the move toward decentralisation, there are noticeable differences between *académies*; 2) ICT seldom is a priority in the field of teacher education, except when municipalities decide to implement a plan for schools; 3) interestingly, there exist more or less informal networks of exchange between académies, for example between primary teachers in charge of helping inspectors for taking care of ICT in the different educational districts.

SECONDARY EDUCATION

As in primary education, priorities are mainly set by academies. Exceptions arise when national policies indicate priorities (e.g. at a time regarding technology teachers). Differences clearly exists between the subject matters where ICT is present in the syllabi and the others. In the first case, training is organized on a regular basis about the usage of specific software instruments. In the second, ICT is not very much present, except perhaps, for what concerns the use of general use software tools (e.g. information retrieval software). Subject matters that do use ICT tools are the technical and vocational fields, Technology, sciences and documentation.

In-service teacher training: curricular framework of ICT for education

Currently, there is no single curriculum framework regarding French in-service teacher training. Priorities vary according to academies and the policies set up at this level. For example, there has recently been an operation aiming at renewing computers in Paris primary schools launched by the municipality. Accordingly, a training scheme has been organised by the academy to accompany this operation.

How in-service teacher training is carried out

There has been a recent interest in new form of e-learning for in service teacher education. Here again, situations do vary according to subject matters and *académies*.

It seems that the trend toward implementing new modalities of teacher education, offering e-resources and organizing training partially at a distance, is rather strong; but the persistence of this trend will require confirmation.

Teachers actual competencies and tasks in using ICT

A recent survey was conducted by the Ministry of Education (Gentil & Verdon, 2003) among a national sample of 368 primary teachers and 1922 teachers of either human sciences or natural sciences. In the sample, almost 9 teachers out of 10 said they used computers outside of the classroom. A majority of them claimed also to use computers in front of students, more or less regularly. The figure was near 90% for primary teachers.

This high ratio does not fully concur with research results. For example, one can read in the Eurydice 2004 report that, according to the 2000 PISA study, by 1999/2000, 60% of 15 years old children in France said they never or hardly ever used computers in the classroom and that the PILRS study found that the figures were 36% for grade 4 pupils in 2001. Qualitative studies led in INRP also indicate far lower ratio when teachers are not accompanied and point upon the importance of assistant educators.

Therefore, independently of possible methodological biases, the high results of the survey probably correspond to the fact that assistant educators were present to help teachers. It draws attention on the need to keep on accompanying teachers in their ICT related tasks.

Concerning secondary education, ratios of regular usage were, according to the same survey, 71% for natural science (where using computer assisted experimentation explicitly figures in the syllabi) and only 50% for human science. This last ratio even drops to 32% when it comes to using ICT in front of students. Among obstacles to usage, the lack of adequate training came at the first place (more than 60% of answers) among the obstacles to using ICT with students.

Research result have also pointed to the importance of informal procedures in the acquisition of ICT competencies, either by peer collaborative work of with the help of assistant educators.

A cooperative research was led in France on the topic of teacher competencies in ICT (Baron & al, 2001). It has led to rather concurrent findings. Four main kinds of competencies have been found to play a part: epistemological, technical, "didactical" (linked with real teaching and learning situations) and pedagogical (linked to the practical management of student activities). It has not been possible to specify which precise competencies were really needed. However, we came to the conclusion that practice is not enough and that some levels of conceptualization of information processing are probably necessary.

Problems that teachers face in using ICT in their practice

As has been said, according to previous studies, French teachers are not techno-phobic and use technology in order to prepare their courses. However, only a minority seems, overall, to use technology within the classroom, except where ICT is an integral part of curriculas. One of the main problems is linked with teacher competencies to use ICT in "real times" situations, in front of students.

However, the situations are not the same if one considers educational technology or the use of software instruments. The first kind of use is less developed, perhaps because 1) using technology changes the traditional parameters of the classroom, and 2) French teachers have a great amount of freedom concerning the methods they want to use with pupils. Therefore if a given environment is not regarded as suitable by the profession, it is extremely unlikely that it will be adopted on a large scale.

Classically, the main reasons claimed for not using ICT are generally expressed in terms of lack (of time, of expertise, of training). Lack of training, in particular, comes at the first place: it is quoted by more than 60% of teachers surveyed in (Gentil & Verdon, 2003).

Content areas involved in teachers' competencies profile in ICT for education

As we have seen, there is no single teachers' competence profile. In subject matters where curricula do include ICT instruments, the corresponding training is taken in charge by the subject matter specialists. Concerning other subjects and primary education, there actually are ICT specialists in the IUFM and in the in-service training teams. Often, they belong to some subject matter and have ICT as a supplementary competency. Among faculty members in charge of ICT in general of common teacher education, one can mainly find specialists in computer science, in education and in information sciences.

References

Scientific contributions

Baron G.L. & Bruillard E. (1994), Information Technology, Informatics and Preservice Teacher Training, *Journal of Computer Assisted Learning*, vol. 10, pp. 2-13.

Baron G.L., Levy J.F. & al. (2001), *Usages éducatifs des TIC: quelles nouvelles compétences pour les enseignants?* http://www.inrp.fr/Tecne/Savoirplus/Rech 40003/accueil.htm

Baron G.L., Bruillard E., Howell C., Mcnergney R.F. (2001b), Technology and teacher education: Evaluating international dimensions of cooperation, Chap. 4, in Heineke W.S., Blasi L. *Methods of evaluating educational technology*, Greenwich (USA): Information Age Publishing, p. 63-74.

Baron G.L. & Bruillard E. (2003), *Information and communication technology: models of evaluation in France* - Evaluation and Program Planning, Elsevier publications, vol. 26, n° 2.

Baron, G.L. & Harrary M. (2003), Potential for Dramatic Change - France, ICT and Decentralization, *LLINE, Lifelong Learning in Europe*, vol VIII issue 3/2003, p. 34 - 43.

Devauchelle B. (2004), *Le brevet informatique et internet (B2I)*: d'un geste institutionnel aux réalités pédagogiques, Doctorat de sciences de l'éducation, Université René Descartes / ss. la dir. de Geneviève Jacquinot, 21.05.2004.

Gentil R. & Verdon R. (2003), Les attitudes des enseignants vis-à-vis des technologies de l'information et de la communication, Direction de l'évaluation et de la prospective, note d'évaluation n° 03.04, December 2003, 6 p.
ftp://trf.education.gouv.fr/pub/edutel/dpd/noteeval /ne0304.pdf

Harrary M. (2004), TICE: pratiques des aides-éducateurs, pratiques des enseignants, in Baron G.L. & al., *Le multimedia dans la classe à l'école primaire*, Lyon: INRP, in press.

Lebeaume J. & Martinand J.L. (1999), Technology education in France: A school subject, in Theuerkauf W.E., Dyrenfurth M.J (Eds.), *Proceedings of the International Working Seminar for Scholars in Technology Education*, Washington DC, September 24-27, 1998 (pp.175-182), Braunschweig/Ames: EGTB-Wocate.

Resources about research

Institut National de Recherché Pédagogique, INRP, research led at the TECNE department.
http://www.inrp.fr/Tecne

Statistical data

EURYDICE (2004), *Key Data* on Information and Communication Technology in Schools in Europe.
http://www.eurydice.org/Documents/KDICT/en/KDICT04EN.pdf

Lemaire S. (2004), Que deviennent les bacheliers après leur baccalauréat? Evolutions 1996 - 2002. Note d'information 04.14, Ministère de l'Éducation Nationale, de l'Enseignement Supérieur et de la Recherche
ftp://trf.education.gouv.fr/pub/edutel/dp

Ministère de l'Éducation Nationale, Direction de l'Évaluation et de la Prospective.
http://www.education. gouv.fr/stateval/default.htm

Certificat internet et informatique

Students:
http://www.education.gouv.fr/botexte/bo020409 /MENT0201078C.htm.
Teachers:
http://www.educnet.education.fr/formation/C2i-ens.htm.

TUTELEC operation

http://www.educnet.education.fr/superieur/fiches/tutelec.htm

IUFM official web site *(in English)*

http://www.iufm.fr/f_qu-iufm.htm

All web addresses have been checked in July 2004.

INFORMATION SHEET OF FRANCE

	Typology of teacher	Educational level	Model of teacher training	Duration	National standard
INITIAL TEACHER TRAINING SYSTEM	*Pre-primary*	Nursery (age 2-5)			☒ Yes ☐ No
	Primary	Primary (age 6-11)	Initial teacher training for primary teachers is organized in IUFMs (*Instituts Universitaires de Formation de Maîtres* - University institutes of teacher training)	2 years (after the bachelor degree)	☒ Yes ☐ No
	Secondary	Secondary (age 11-18) There are currently three main types of secondary teachers: - qualified (*certifiés*) - vocational education teachers (*professeurs de lycée professionnel*) - *agrégés* (teachers who receive a better salary and have less teaching duties)	Also initial teacher training for secondary teachers is organized in IUFMs. As far as the *agrégés*, they are recruited by a very selective competitive examination organized in a variety of subjects, called the *agrégation*. Candidates generally prepare this competitive examination at the university, or in a higher normal school (*Ecoles normales supérieures*). Those who pass the competitive examination follow the second year of IUFM.	2 years (after the bachelor degree)	☒ Yes ☐ No
	Vocational	see above	see above	see above	☒ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

Regarding ICT, IUFM have in the past played an important role regarding ICT and programs have been launched rather early, aiming at giving teachers a sufficient familiarity with ICT, generally in the field of "general training". The evolution, since the beginning of the 1990, has however been toward the integration of ICT training within the existing subject matters and a decreasing importance of specific ICT courses.
The national text reorganizing the second year of training quoted above mentions explicitly ICT only 4 times in more than 11000 words. It refers six times to information and communication technology in the broad sense, never as a priority and rather vaguely: about the use of resources in personal work, the use of ICT tools by interns, the need to sensitize trainees to the impacts of living in an information society, the need to demonstrate in submitted work the use of ICT. For secondary teachers there is also an item about integrating the use of ICT in their professional practice. For primary teachers, a 15 hours module is to be organized: "learning to master the teacher 'tools': the body, the voice, the technological tools". For secondary teachers, priority is given to disciplinary training.
The main idea is that what can be learned within the subject matters and in the practicum will suffice to cover most of the needs.

IN-SERVICE TEACHER TRAINING SYSTEM

Focus of training pertaining to ICT for education

- ☐ use of applications (personnel utilities)
- ☒ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher operating in the knowledge society

Participation in continuing education is a right for French teachers. A majority of them undertake this and almost all those applying for it receive at least one training period in the school year. Training activities chosen by teachers are supported by the administration, mainly in the form of paid educational leave or release from duty. The actions of professional development have been decentralized since the beginning of the nineteen eighties.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

Currently, there is no single curriculum framework regarding French in-service teacher training. Priorities vary according to academies and the policies set up at this level.
As far as primary school, ICT seldom is a priority in the field of teacher education, except when municipalities decide to implement a plan for schools. Interestingly, there exist more or less informal networks of exchange between academies (regions), for example between primary teachers in charge of helping inspectors for taking care of ICT in the different educational districts.
As far as secondary school, as in primary education, priorities are mainly set by academies. Exceptions arise when national policies indicate priorities (e.g. at a time regarding technology teachers). Differences clearly exists between the subject matters where ICT is present in the syllabi and the others.
In the first case, training is organized on a regular basis about the usage of specific software instruments. In the second, ICT is not very much present, except perhaps, for what concerns the use of general use software tools (e.g. information retrieval software).
Subject matters that do use ICT tools are the technical and vocational fields, Technology, sciences and documentation.

Focus of training pertaining to ICT for education

- ☐ use of applications (personnel utilities)
- ☐ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher who operating in the knowledge society

Remarks

As far as initial training:
At the end of the first year at the IUFM, students sit for a competitive examination, where the number of open positions corresponds to a national planning of teaching needs in the future years. The first year is therefore designed to prepare for the competitive examination. Students who pass the competitive examination become paid interns (stagiaires) and follow a second year of professional training, teaching part time under the supervision of a mentor. At the end of the second year, they undergo an evaluation of their teaching, which is not very selective. After completing it, they become civil servants of the state and have tenure.

Initial teacher training: objectives, subject areas and institutional courses

Due to the principle of cultural sovereignty and for historical reasons teacher training in the Federal Republic of Germany displays a high degree of diversification per levels and types of schools. Additionally, teacher training has to combine subject-related studies, educational science and subject-related didactics as well as to provide for a meaningful relation between theory and teaching practice during preparatory service. Furthermore, the subjects of the first phase of teacher training have to be adjusted to the subjects of the second, predominantly practical phase. This situation presents a considerable number of varying demands which, as the *Gemischte Kommission Lehrerbildung* has pointed out clearly, are not met by the present practice of teacher training. Teacher training is basically divided into two stages, a course of higher education and practical pedagogic training. Teacher training courses are offered at universities (*Technische Hochschulen Technische Universitäten*) colleges of education (*Pädagogische Hochschulen)* and colleges of art and music. Practical pedagogic training in the form of a preparatory service takes place in teacher training institutes (*Studienseminare*) and training schools.
For study courses at universities, in some *Länder* there are plans to establish institutions (e.g. centres for teacher training) which are suited to coordinate teacher training between the faculties and to guarantee an adequate relationship to teaching practice.

Edwin Stiller
State Institute for schools

Responsible for the section "Initial teacher training (First and second phase)" in the "State Institute for School", Soest, NorthRhine-Westphalia.
Editor and author of school books and teaching publications in the social and educational sciences.

ADMISSION REQUIREMENTS

The basic entry requirement for teacher training courses is the higher education entrance qualification *Hochschulreife* which is acquired after attending school for 12 or 13 years and passing the *Abitur* examination.

CURRICULUM, BRANCH OF STUDY

The various careers for which teachers are trained correspond to the levels and types of school in the *Länder*. In view of the resulting large number of different designations for teaching careers, the following six types of teaching careers can be distinguished for reasons of clarity:

Type 1 Teaching careers at the Grundschule or primary level
Type 2 General teaching careers at primary level and all or individual lower secondary level school types
Type 3 Teaching careers at all or individual lower secondary level school types
Type 4 Teaching careers for the general education subjects at upper secondary level or for the Gymnasium
Type 5 Teaching careers in vocational subjects at upper secondary level or at vocational schools
Type 6 Teaching careers in special education

In all *Länder* training is divided into studies at a university or equivalent institution of higher education and practical pedagogic training (preparatory service). The first period of training includes:

- a specialist component (including subject-related didactics) with the study of at least two subjects or subject areas;
- an Educational Science component with compulsory study of educational theory and psychology; plus a choice of additional study areas (e.g. Philosophy, Social Sciences, Politics and Theology);
- teaching practice, sometimes of several weeks duration, accompanying courses of study.

In addition, teacher training is also to cover issues concerning special education.

TRAINING MODELS

First stage of teacher training: studies at a higher education institution

The characteristic elements of the courses for the six types of teaching career are described below in generalised form. The details are laid down by the Länder in study regulations, training regulations and examination regulations. These include in particular provisions on the following:

- subjects/subject areas and combinations that may be chosen for the respective teaching career;
- the scope and content of the course of study in the individual subjects/subject areas, including subjects relating to educational sciences and subject-related didactics;
- the type of certificates required for admission to examinations;
- the type and scope of individual parts of the examinations and assessment procedures.

Teaching career type 1: Teaching careers at the Grundschule or primary level

Training for this type of teaching career consists of a seven-semester course of study with a total of 120 aggregate hours of weekly attendance, which devotes particular attention to educational science and practical teaching components. The training incorporates study of an elective or specialised subject as well as primary school didactics. Alternatively, future primary school teachers may study either areas of learning or one or several subjects if subject-related elements of didactics are incorporated into their course. Subject options and specialisations vary from Land to Land.

The basic educational science course incorporates general and school Pedagogy as well as Psychology; possible options are Philosophy and Sociology/Political Science or Theology. The course of study usually includes at least one practical training period of several weeks, and should also incorporate at least one guided didactics/subject-related didactics placement. Placements completed outside the school sector can also be used to complement the training. The course of studies focuses on the key academic areas of the subjects/learning areas being studied, with the aim of enabling the students to deal with complex issues and to develop a multi-disciplinary and interdisciplinary approach to their work. German and Mathematics, as well as artistic and cultural subjects, have a special position in many Länder and this is reflected in certain study.

Teaching career type 2: General teaching careers at primary level and all or individual lower secondary level school types

Training for a teaching career within this category corresponds largely to that for a type 1 teaching career. Depending on the Land a teaching qualification can be acquired both for the primary level and for certain lower secondary school types or for the entire lower secondary level. Study of selected subjects at an academic level is geared partly to the relevant type of school or school level.

Teaching career type 3: Teaching careers at all or individual lower secondary level school types

The courses for teaching careers included in this group lead to teaching qualifications for all or for specific lower secondary level school types. As a rule a 7 semester course of study with a total of between 120 and 160 aggregate hours of weekly attendance of at least two subjects together with appropriate incorporation of subject-related didactics and an accompanying course in educational science. Students should also complete at least one guided didactics/subject-related didactics placement. Placements completed outside the school sector can also be used to complement the training.

Teaching career type 4: Teaching careers for the general education subjects at upper secondary level or for the Gymnasium

Training for this type of teaching career involves a course of study generally lasting 9 semesters (occasionally 12 semesters in the case of artistic subjects) with a total of 160 aggregate hours of weekly attendance of at least two subjects, with subject-related didactics also to be included. The course of study is designed to incorporate all academic

aspects of the subjects being studied and should develop the student's ability to tackle complex issues and to work in a multidisciplinary and interdisciplinary manner. At least one period of practical training lasting several weeks is also required, as is at least one guided placement in didactics/subject-related didactics. Placements completed outside the school sector can also be used to complement the training.

Teaching career type 5: Teaching careers in vocational subjects at upper secondary level or at vocational schools

Teacher training incorporating a teaching qualification in subjects offered by vocational schools, both for subject-specific theory and general subjects, usually involves a 9-semester course of study, with a total of around 160 aggregate hours of weekly attendance. Students must also complete a period of work experience lasting at least 12 months which must be relevant to the vocational subject area chosen and which must be completed before the First State Examination. Under an agreement reached by the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder, about half of the course involves in-depth study of a vocational subject area. The other half includes study of educational science on the one hand and, on the other, study of a subject relevant to a number of occupational fields or of a general education subject or study of an additional vocational subject area or of a subject area relating to special education at an approximate ratio of 3:5. The study of subject-related didactics and practical teaching periods at schools are part of the course.

Teaching career type 6: Teaching careers in special education

The qualification to become a special education teacher can be attained either by passing the First and Second State Examinations following a first degree course of study or by embarking on an additional course of study following teacher training for a different type of teaching which is also concluded with a state examination. In the Länder the two forms of training exist side by side or as alternatives.

Under a resolution reached by the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder, the standard period of *Regelstudienzeit* for a first degree course of study is a maximum of 9 semesters with a total of 160 aggregate hours of weekly attendance. The course includes the study of educational science and subject-related studies in at least one subject or subject area and in special education. About half of the course is devoted to the study of special education while the other half is devoted to educational science and subject-related studies at an approximate ratio of 2:3. Didactic studies and teaching practice are an integral part of the course.

Two of the following subject areas relating to special education, the weighting of which can vary in the course of study and examinations, are selected: education for the blind, education for the deaf, education for the mentally handicapped, education for the physically disabled, education for children with learning difficulties, education for the hard of hearing, education for the visually handicapped, for those with speech defects and education for those with behavioural problems.

Second stage of teacher training: preparatory service

For all teaching careers studies at a university or equivalent institution of higher education are followed by the *Vorbereitungsdienst* (preparatory service) as the second stage of teacher training. Generally lasting 2 years and with the particular emphasis depending on the Land and the type of teaching career, it involves sitting in on lessons, guided and independent teaching at training schools and studies in educational theory and subject-related didactics at teacher training colleges which reappraise and consolidate experience gained through practical training. Some Länder plan to reduce the duration of preparatory service to 18 months by means of awarding credits for semesters of practical pedagogical training, other courses in teaching practice etc.

Evaluation, certificates

As with all courses of study in higher education, certain certificates are required for admission to examinations and intermediate examinations have to be taken in teacher training courses. The teaching courses conclude with the examination known as the First *Staatsprüfung* which entitles the holder to be accepted into the state preparatory service. Individual Länder have already reached the planning or testing stage for the introduction of Bachelor and Master study courses in teacher training but are maintaining state responsibility for final examinations.

It is the task of the state examination boards, which are subordinate to the ministries responsible for the school system, to hold the First State Examination. The examination usually consists of the following:

- a dissertation in the first or second subject or in educational science;
- a written and oral examination in the subjects studied, mainly on academic aspects of the subject, but possibly also on subject-related teaching methodology;
- an examination in educational sciences;
- where appropriate, a practical examination in artistic/cultural or technical subjects and sport.

The preparatory service concludes with the Second State Examination. This is the prerequisite for ultimate employment in a teaching career, but does not guarantee a teaching position. It has to be taken before a state examination board or a state examination commission and usually consists of four parts:

- a major written paper relating to educational theory, pedagogic psychology or the didactics of one of the subjects studied;
- a practical teaching examination involving demonstration lessons in the chosen subjects;
- an examination on basic questions of educational theory, educational and civil service legislation and school administration and occasionally on sociological aspects of school education;
- an examination on didactic and methodological issues in the subjects studied.

Current reform initiatives

The current attempts at reform are based on the results of the work of the *Gemischte Kommission Lehrerbildung* of 1999 and the recommendations for the future structure of teacher training by the Science Council of 2001. With regard to the reforms considered necessary, the efforts of Länder with particular emphasis on their individual priorities, aim to focus on the following measures to reform teacher training:

- a more extensive practical orientation during teacher training;
- intensification of the relations between the theoretical and practical phases of training;
- particular significance of the induction period for newly qualified teachers;
- qualification of higher education graduates without formal teacher training;
- measures to improve teaching practice with regard to diagnostic and methodical competence;
- improvement of the image of the teaching profession.

BACHELOR'S AND MASTER'S DEGREES IN TEACHER TRAINING

In some Länder, the reform of teacher training is to include the implementation of the consecutive structure of study courses with Bachelor's and Master's degrees (BA/MA) which was introduced in Germany with the amendment of the Framework Act for Higher Education (*Hochschulrahmengesetz*) of 1998. Currently, some Länder are planning a modularisation of teacher study courses and the introduction of consecutive study courses with Bachelor's and Master's degrees. The degrees obtained by successfully attending these new teacher study courses are mutually acknowledged by the Länder if they meet

the standards the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder has agreed upon in March 2002.

Initial teacher training: curricular framework of ICT for education

First of all, I have to point out, that initial teacher training (ITT) in Germany is consecutive: general studies at a university concluded with the first state exam (*Erstes Staatsexamen*) is followed by a practical education at schools and teacher training seminars (*Studienseminare*) with the final exam (*Zweites Staatsexamen*) which gives Qualified Teacher Status. Most of the following explanations are related to the state of North-Rhine-Westaphalia (NRW). In the Federal Republic of Germany every state has its own education policy and its own education system.

A curricular framework exists for both phases of initial teacher training, which is entitled: "Future of learning – learning for the future: New Media in initial teacher training" (Ministry of Education and Science, Düsseldorf 2000).

Central aims for both phases are:

- to act competently with ICT;
- to understand the role of ICT in the socialisation of children;
- to use ICT as educational technology;
- to use ICT for administration and school development;
- to analyse the personal, organisational and institutional conditions for an effective use of ICT and to take part in the development of a school concept for ICT.

In the first initial teacher training phase at university they emphasise:

- the theories and concepts of ICT;
- the selection of different types of media for different functions in the process of learning;
- the development and production of educational software and other media products;
- basic theory of ICT;
- use of ICT in discipline and interdiscipline education;
- educational challenges of ICT.

In the second phase of initial teacher training at the *Studienseminar* they emphasise in the general education seminar (*Hauptseminar*) the role of ICT:

- for the teacher-personality and the social role of teachers;
- in education and assessment;
- in education and advising;
- in organisation, innovation and school-development.

In the discipline-seminars (*Fachseminare*) typical topics are:

- the use of ICT in discipline projects;
- activity planning and evaluation;
- the selection and evaluation of educational software;
- the role of the discipline in building up a general media competence.

How initial teacher training is carried out

In the first phase of ITT there are three forms of ICT education:

- integrated in the general studies as an obligatory element;
- some universities give the opportunity for a specialised course and certificate *Medien- und Informationstechnologien in Erziehung, Unterricht und Bildung* (for example at the University of Paderborn);
- students can enrol for a distance ICT-seminar at the *Fernuniversität Hagen*;

In the second phase of ITT there are various forms of ICT training:

- integrated in every discipline-seminar *Fachseminar* discipline orientated teacher training;

• in the *Hauptseminar* general questions of ICT education;
• project days.

All teacher training centres in NRW are integrated into the administration network (*Landes-Verwaltungsnetz NRW*) and organise all questions about administration with central government ICT Tools. Almost every training centre has its own web-site and many *Fachseminare* and *Hauptseminare* use BSCW-Platforms for collaborative work.

The students and the *Referendare* in the second phase have the opportunity to write a portfolio which documents their development in ICT competencies. The State Institute for School in Soest worked out a portfolio concept and designed a portfolio set, which contains tables and a grid for media products.

In-service teacher training: objectives, subject areas and bodies

In-service training serves to maintain and extend the professional skills of teachers. It helps teachers to meet the current requirements of their teaching career and to fulfil the educational mission of their school. Attendance of in-service training courses serves to deepen and extend the knowledge and skills in the fields of educational theory, psychology, didactics and subject-related studies which the teacher requires as part of his job.

With regard to the further development of this sector, the *Gemischte Kommission Lehrerbildung* has formulated the following principles which reflect the problems related to the realisation and organisation of in-service teacher training measures:

- Institutionalised in-service teacher training is regarded as only one part of a general and continuous "learning on the job". The measures should aim to give the impetus to realise further learning on the job individually or within a group of colleagues as a natural component of one's professional practice.
- The intensification of in-service training should not lead to the cancellation of more lessons. From the point of view of the commission, it can therefore be demanded of teaching staff to participate in in-service training courses when they have no teaching commitments.
- In addition, it seems particularly important to overcome the selective and individual character of in-service teacher training in order to influence the level of classroom activity more broadly.
- As far as the question of voluntary or obligatory participation in in-service training is concerned, from the point of view of the commission it is of central significance to perceive the participation in measures for in-service training not as an individual decision but as a contribution to the development of the individual school and part of the development of teaching staff within the individual school.

TYPES OF INSTITUTIONS

State-run in-service teacher training is organised in the Länder at central, regional and local level. In-service training can also take place within schools or in the form of guided private study. In order to organise in-service teacher training at central locations, all Länder have established state-run in-service training institutes which are subordinate to the Ministries of Education and Cultural Affairs as dependent Länder institutions. Central in-service training institutions (a specific Land can have several such institutions) have various names such as state academy (*Staatliche Akademie*) or academic institute for in-service teacher training (*Wissenschaftliches Institut für Lehrerfortbildung*). In-service teacher training at regional level is conducted differently in each Land by the institutes for in-service teacher training and their branches and by middle- and lower-level school supervisory authorities.

Lower-level school supervisory authorities *Schulämter* are usually responsible for the organisation of in-service training at local level.
In-service teacher training within schools is carried out by schools for their own teaching staff or some members of their teaching staff.

In-service teacher training: curricular framework of ICT for education

For In-Service-Teacher-Training (ISTT) a curricular framework does not exist as yet. However there are several initiatives in public private partnership (*e-initiative Schulen ans Netz*) to build up teacher competencies in ICT and to support teachers and schools in ICT aspects.
The *e-initiative* offers three types of ISTT:
- the *e-card* project. Local adult centres offer special courses for teachers to give them a basic qualifications in ICT;
- the project "*Intel – Lehren für die Zukunft*" qualifies many teachers in a school focused course;
- in NRW we have a cascade system of trainers: the e-teams which support schools directly.

In NRW we have three types of ISTT (school-focused, external and online courses).
The State Institute for School provides modules for online teacher training on diagnostics in education and qualifies tutors for online teacher training.
Additional online courses at present are:
- "*abitur online*" (online courses for pupils in grammar schools in the disciplines German Language, Mathematics and Social Sciences);
- "*chat der welten*" and "*agenda 21";*
- media competencies in school and education;
- "*Festum*" a long distance course in co-operation with the Fern-Universität Hagen

The State Institute for School provides an educational server in NRW (www.learn-line.de) which supports all ISTT projects.

How in-service teacher training is carried out

In ISTT there is an increasing use of ICT tools in NRW. At this time we have no systematic data base about this particular question. The State Institute for School supports all ISTT projects with the educational server, with BSCW platforms and has just started to qualify tutors for online-learning.

Teachers actual competencies and tasks in using ICT

In Germany a study carried out at national level by the National Ministry of Education and Science shows that 9 % of schools have stationary and mobile ICT equipment.
In primary schools 48% of ICT-equipment is suitable for multimedia work, in grammar schools and vocational schools this figure is 65% of all schools use the world wide web.
A study from the Research Institute for School Development at the University of Dortmund shows that:
- approx: only 4% of all teachers have specialised competencies (network, maintenance of hard and software, etc.);
- 30% of teaching staff need support in questions of software and hardware problems;
- about 50% of staff has little or no knowledge in ICT questions;
- nearly all schools use ISTT courses in ICT;
- on average 62% of all teachers take part in such courses.

Problems that teachers face in using ICT in their practice

The report from the Research Institute for School Development in Dortmund shows that:

- 80% of teaching-staff say that the ICT equipment is insufficient,
- 44% complain about the lack of data projectors,
- 31% complain that there is no sufficient personal support in ICT questions,
- 43% are worried that they have no effective possibilities of controlling pupils activities on the world wide web
- only 6% are of the opinion that the internet is not helpful in school education.

INFORMATION SHEET OF GERMANY

	Typology of teacher	Educational level	Model of teacher training	Duration	National standard
INITIAL TEACHER TRAINING SYSTEM	*Pre-primary*	Kindergarten (3-6)	As primary teachers		☒ Yes ☐ No
	Primary	Primary level (6-10) or primary level and lower secondary (6-15) lower secondary (10-15) (depending on the Land)	First stage: trained at an higher education institute. The courses include study of an elective or specialised subject as well as primary school didactics. The teaching courses conclude with the First Staatsprüfung examination necessary to be accepted into the preparatory service (2nd stage). The preparatory service concludes with the Second State Examination which gives Qualified teachers Status.	**5 1/2 years** divided in: 3 1/2 years (1st stage) + 2 years (2nd stage)	☒ Yes ☐ No
	Secondary	Upper secondary (15-19)	Training involves a course of study attending at least two subjects, with subject-related didactics also to be included. The teaching courses conclude with the First Staatsprüfung examination necessary to be accepted into the preparatory service (2nd stage). The preparatory service concludes with the Second State Examination which gives Qualified teachers Status.	**6 1/2 years** divided in: 4 1/2 years (1st stage) + 2 years (2nd stage)	☒ Yes ☐ No
	Vocational	vocational subjects at upper secondary level or Vocational school	Teacher training incorporating a teaching qualification in subjects offered by vocational schools, both for subject-specific theory and general subjects. Students must also complete a period of work experience lasting at least 12 months which must be relevant to the vocational subject area chosen and which must be completed before the First State Examination that entitles the holder to be accepted into the state preparatory service (2nd stage). The preparatory service concludes with the Second State Examination which gives Qualified teachers Status.	**6 1/2 years** divided in: 4 1/2 years (1st stage) + 2 years (2nd stage)	☒ Yes ☐ No

Content areas involved in teachers' competencies profile in ICT for education

University A1 Theories and Concepts of ICT
Content Areas: A2 Selection and use of ICT
A3 Development, design and production of educational media products
B1 Basics in use of ICT in education-processes
B2 Use of ICT in discipline- and interdiscipline education
C1 Educational Challenges of ICT
C2 ICT basic education.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

A curricular framework exists for both stages of initial teacher training (ITT), which is entitled: "Future of learning - learning for the future: New Media in initial teacher training" (Ministry of Education and Science, Düsseldorf 2000)
In the first stage of ITT there are three forms of ICT education:
- integrated in the general studies as an obligatory element
- some universities give the opportunity for a specialised course and certificate "Medien- und Informationstechnologien in Erziehung, Unterricht und Bildung" (for example at the University of Paderborn)
- students can enrol for a distance ICT-seminar at the "Fernuniversität Hagen"

In the second stage of ITT there are various forms of ICT training:
* integrated in every discipline-seminar "*Fachseminar*" discipline orientated teacher training
* in the "*Hauptseminar*" general questions of ICT education
* project days

The students and the "*Referendare*" in the second stage have the opportunity to write a portfolio which documents their development in ICT competencies.

Focus of training pertaining to ICT for education

☒ use of applications (personnel utilities)
☒ digital literacy
☒ specific subject
☒ use in classroom
☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

With regard to in-service training, the Gemischte Kommission Lehrerbildung has formulated the following principles which reflect the problems related to the realisation and organisation of in-service teacher training measures:

- Institutionalised in-service teacher training is regarded as only one part of a general and continuous "learning on the job". The measures should aim to give the impetus to realise further learning on the job individually or within a group of colleagues as a natural component of one's professional practice.
- In addition, it seems particularly important to overcome the selective and individual character of in-service teacher training in order to influence the level of classroom activity more broadly.
- As far as the question of voluntary or obligatory participation in in-service training is concerned, from the point of view of the commission it is of central significance to perceive the participation in measures for in-service training not as an individual decision but as a contribution to the development of the individual school and part of the development of teaching staff within the individual school.

State-run in-service teacher training is organised in the Länder at central, regional and local level. In-service training can also take place within schools or in the form of guided private study.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

For in-service-teacher-training (ISTT) a curricular framework does not exist as yet. However there are several initiatives in public private partnership (*e-initiative,* "Schulen ans Netz") to build up teacher competencies in ICT and to support teachers and schools in ICT aspects.
The e-initiative offers three types of ISTT:
* the *e-card* project. Local adult centres offer special courses for teachers to give them a basic qualifications in ICT
* the project "*Intel - Lehren für die Zukunff*" qualifies many teachers in a school focused course
* in NRW we have a cascade system of trainers: the e-teams which support schools directly

In NRW we have three types of ISTT (school-focused, external and online courses). The State Institute for School provides modules for online teacher training on diagnostics in education and qualifies tutors for online teacher training.

Focus of training pertaining to ICT for education

☒ use of applications (personnel utilities)
☒ digital literacy
☒ specific subject
☒ use in classroom
☐ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

The state's first concern about preschool education was manifested through Law BTMÈ/1895. Under this law, private citizens could establish kindergartens, after securing a permit from the Ministry of Education. Thus, in 1897, the Hellenic Women's Union founded the Kindergarten Teachers' Academy (*Didaskaleio Nipiagogon*), which is regarded as the first school for training kindergarten teachers.

Secondary school teachers are promoted by decision of the Head of Secondary Education of each Prefecture, according to the promotion lists drawn up by the relevant Regional Secondary Education Service Council (PYSDE) during the month of April each year.

These lists are drawn up according to fields, and are in alphabetical order. They include all those who will have completed the required length of time for promotion by 30th April of the following year, and who are found to be promotable on the basis of their professional qualifications and departmental status. For the holders of either a postgraduate University degree requiring at least one year's study, or a University doctorate related to the subject of their employment, the time required for promotion is reduced by a year for promotion to level B'. For promotion to level A', the required time is reduced by a year for the holders of a post-graduate (master's level) degree, and by two years for the holders of a doctorate.

Giorgos Papadopoulos
Hellenic Pedagogical Institute

Giorgos K. Papadopoulos is Consultant of Education and Head of ICT unit, in Hellenic Pedagogical Institute. He received the Diploma in Mathematics from University of Thessaloniki, the MSc in Computer Science from University of Athens and the Ph.D. in Systems Reliability from University of Athens.

Michalis Karamanis
Information Society SA

Michalis Karamanis is an Instructional Designer and Project Manager in Information Society SA, a government organisation responsible for the design and implementation of ICT projects under EU funding for the Greek public sector. He holds a BSc in Physics and an MSc in Learning Systems Design.

According to the Royal Decree of 1836, teachers at Hellenic Schools had to be secondary school graduates, have had teaching practice, and have been examined as regards their experience and ability. After the establishment of the University of Athens (1837) and the National Technical University (1914) and up to the present day, the basic training of secondary school teachers in the departments related to their fields lasts for four or five years. The education of teachers for Technical and Vocational secondary school education was systematised for the first time in 1959 with the establishment of the School for Technical Education Teachers (SELETE) which – after subsequent regulations – offered two kinds of educational programs.

1) *Four-year studies of higher level education* (Engineering and Technology Teachers' Institute ASETEM), in which the pedagogical training was parallel to the technological education in four engineering specialisations: Civil (two directions), Electrical, Mechanical and Electronic.

2) *One year pedagogical training* (Technical Pedagogy School – PATES) to graduates of higher education, i.e. Universities and Technological Education institutes, of other specialisations as Economics Agronomy, Law, Computer Science, Medicine, etc.

SELETE was abolished by Law 3027/02 and the Higher School for Teachers of Technological Education (A.S.PAI.T.E.) was established, which belongs together with the Technological Education institutes in the Technological Branch of Higher Education.

The graduates of A.S.PAI.T.E. are appointed without any other cognitive prerequisites in the Technical and Vocational education. Higher Technological Education is the final phase of an evolution over the last

30 years starting from Higher Professional Education. This development was the outcome of rapidly advancing technology and science on one hand, and the increasing needs of the economy and society for experts with a high educational level on the other. Similarly, there was a development in the qualifications of the Institutes' educational staff. Initially, professional experience was the main requirement, and academic and scientific qualifications came after; gradually, however the center of gravity shifted to scientific qualifications.

Initial teacher training: curricular framework of ICT for education

Initial teacher training is carried out by University Departments. Nursery school teachers as well as Primary school teachers receive their initial training during their four-years studies at the Pedagogical Departments, which have been established to almost all the Universities around the country. These Departments replaced since early 80's the former Pedagogical Academies which were in charge of the teacher training through a two years long syllabus.

Secondary education teachers don't receive any initial training as far as their pedagogical and instructional skills are concerned. They are graduates from various University departments like Science, Maths, Literature, ITC, etc. In the syllabus of these Departments some Pedagogical and Instructional courses are offered.

Vocational training teachers are mainly graduates of the University Engineering Departments and the majority of them do not receive any initial pedagogical and instructional courses during their studies. There is though a specific department, which focuses on the training of technical teachers through a four-years long syllabus (SELETE).

ICT for education was first introduced into the Primary Education Departments' syllabus at late 80's early 90's. The early topics were mostly focused on ICT basic skills as well as the implementation of Logo Programming Language in Science and Maths teaching. Since these early days many new topics were introduced into the syllabus of these Departments in an attempt to fit their curricular framework to the demands of technology and social changes. Although we can't describe a precise national curricular framework for ICT in education, since the Primary Education Departments are independent Academic Departments responsible for the formation of their own curricular framework, the Departments curricula focus on the following basic common axes:

1. Basic Skills in ICT use:
   - Operating Systems
   - Word Processing
   - Spreadsheets
   - Internet and e-mail.
2. ICT in Educational process:
   - Educational software evaluation
   - Educational software implementation in daily school practice (Maths, Science, Literature, History, Languages etc).
   - Using Internet and e-mail in classroom
   - Using ICT in educational research
   - Using ICT in educational management.

As far as secondary education teachers are concerned the majority of them don't have any strong pedagogical background as it has already been mentioned. All the University Departments from which the secondary teachers graduate offer ICT basic skills courses at least during the last decade. Many of them, especially science and technology departments, offer programming courses or courses concerning ICT applications' use for research purposes. There are a few University Departments, especially Literature, Philosophy and

Psychology Departments, which offer lately some courses concerning ICT in education. In any case we can't describe any National Curricular framework concerning ICT in education for the initial secondary teacher training.
Technical and Vocational Teachers who graduate from the University Engineering Departments have, before their service, to attend a special one year long course (PATES). This course focuses on instructional methods and techniques as well as on pedagogical theories. The graduates from the four years long courses (SELETE) have a rather strong pedagogical background as in the syllabus of the SELETE Department both Engineering and Instructional courses are included.
The above courses integrate into their syllabus the following topics concerning ICT in education, apart from a topic concerning ICT basic skills:

- Pedagogical consideration of ICT
- Educational Technology - Multimedia.

During the last decade, through a strong motivation framework announced by the Ministry of Education, many University Departments have developed special postgraduate courses concerning ICT in education as well as subject teaching.
The courses concerning ICT in education are organised mainly by the Primary education Departments. The curriculum focuses both on the technologies and on the classroom use of ICT. The subject teaching courses (Science, Maths, Language, etc.) focus mostly on the instructional methods and techniques of the specific subjects. Moreover, there are some topics focusing on ICT in education mostly concerning the evaluation and use of specialized in the various subjects educational software.
In any case the majority of the in-service teachers (Nursery, Primary, Secondary, Vocational) have not received any courses concerning ICT basic skills or ICT in Education during their initial training, as they have graduated before the major changes to the University Departments' Syllabus which took place during the last decade.

How initial teacher training is carried out

Most of the University Departments use nowadays ICT infrastructure in their teaching process. Precisely:

- Students retrieve lecture notes through the Web and submits their assignments through the Web.
- Students have to prepare and form their assignments using off the self-applications (office suite, statistical packages, etc.).
- Most of the departments have sophisticated computer labs available for students use.
- Collaborative work using ICT tools is not a common practice to the University teaching process; it is implemented though to some post graduate courses.
- Some departments (NTUA, UoA, UoM, etc.) process sopfisticated videoconference classrooms, which they use for teaching purposes.
- Some postgraduate courses (NTUA, UoA, UoM, etc.) are offered through a blended learning model both on-line and face to face. On-line techniques are mostly used for assessment and notes retrieval purposes.

In-service teacher training: objectives, subject areas and bodies

The Ministry of Education is in charge of designing and implementing teacher training policy. For this purpose the following organisations are established.
The Hellenic Pedagogical Institute, which was established in 1964 (www.pi-schools.gr) and among others is responsible for the auditing of the following described Regional Teacher Training Centres. The National Teacher Training Organisation established in

2002 responsible for the national policy and designing process as far as teacher training is concerned. The Regional Teacher Training Centers were established in 1985 (1566/85) replacing former training institutes but they really started to work at early 90's. There are 16 RTTC around the country. These centers focus on in-service training of teachers of all the education levels. Three types of training courses are offered:

1. Introduction training courses: these courses are tailored for the teachers who have just started their teaching career and include three phases, which take place during the first year of the teacher's service. The syllabus of the course aims to familiarise the new teachers with the educational reality and to offer basic instructional skills. These courses include also some introductory topics concerning the role of the teacher in the information society.
2. Crash obligatory training courses: these courses focus on specific teaching subjects and techniques and they are used as tools for the dissemination of new curricula, new books, new teaching techniques, policies, etc.
3. Crash optional training courses: these courses focus mostly on innovation in teaching and learning specifically as far as the following axes are concerned:
   - specific scientific subjects;
   - instructional methodologies;
   - daily school practice.

Nursery and Primary Education teachers who graduated from the two year long Pedagogical Academies, have the opportunity basically during their service to attend special courses which are organized by the Pedagogical Departments around the country and started in 1992 (L.130/90) in order to upgrade their skills and degrees. These courses last two years and the teachers attend lectures during weekends. Until today about 35000 nursery and primary school teachers have graduated from these courses. These courses focus on teaching and instructional methodologies as well as on specific teaching subjects (Maths, Science, Literature, etc.). Moreover, these courses introduce modern pedagogical theories as well as modern teaching tools (story telling, environmental activities, etc.).

From 1996 to 2003 a large number of teacher training programmes were implementing under the administration of the Hellenic Pedagogical Institute and with the contribution of the University Departments and the Computer Technology Institute which acts as a consultant of the Ministry of Education as far as ICT subjects are concerned. These programmes were partly funded by the EU and focused basically on providing support to teachers in their attempt to utilise ICT in their daily school practice.

In-service teacher training: curricular framework of ICT for education

The Regional Teacher Training Centers, as it has been mentioned above, focus mostly on the teaching skills as well as on the pedagogical and subject background knowledge of the teachers. A number of modules, first introduced in 1996, concerning ICT in education are included:

- ICT basic skills
- Pedagogical consideration of ICT
- Internet technologies at classroom
- Educational software evaluation
- Educational software classroom implementation.

About 2000 secondary teachers took part to these courses from 1995 until today.

The special courses concerning the Pedagogical Academies graduates as it was mentioned above are organized by the Pedagogical Departments of the Universities around the country. As a result of this structure, there is no common curricular framework of the courses. Broadly speaking the modules concerning ICT in education are organized around the following topics:

- ICT basic skills

- Internet technologies for classroom use
- Educational software evaluation
- Curriculum areas and ICT.

From 1992 to 2004 about 35,000 teachers graduated from these special courses.
From 1996 until 2002 the following in-school teacher training programmes concerning ICT in education took place all over the country. These training programmes were organized under the administration of the Hellenic Pedagogical Institute and the Computer Technology Institute. These courses concentrate on the trainers training as well as on in-school training.
Training Programme "ODYSSEAS" (1997-2000):
The Programme was part of the national horizontal project "ODYSSEY" concerning ICT in Teaching and Learning. ODYSSEAS was the part of the project concerning the utilization of education software for subject teaching to 60 schools distributed in three regions of the country. Through the project about 900 secondary school teachers attended training courses concerning the use of educational software in various subjects teaching.
Training Programme E42 (1999-2002):
E42 was a part of ODYSSEY project as well and concerned trainers training. The programme was administrated by the Computer Technology Institute and organised by the University of Athens, the University of Macedonia and the University of Thessaloniki. The training courses lasted one year and the syllabus integrated both lectures and practice in the schools. The project concerned 130 secondary teachers with special qualifications.
Training Programme E41 (2000-2002):
Through the programme many in-school teacher training courses were implemented. The courses concerned 4000 secondary teachers and were organized by the teacher trainers graduated by the E42 courses. The trainers visited the schools of their responsibility one day every week for a school year time. During this time teachers attended pilot teaching sections concerning ICT in education. Furthermore, once a month special meeting for subject teaching was organized concerning teachers from different schools.
Although the previous projects were of limited scale contributed mostly as far as the accumulated experience was concerned. They couldn't though really face the training problem of the 140,000 Greek teachers.
In 2000 the Greek Ministry of Education announced a large scale National Plan named "Preparing Teachers of the Information Society" concerning teachers in-service teacher training in ICT. The project was implemented as the Greek action in the European action plan e-Europe (Lisbon 2000).
The goal of the plan was that by the end of 2003 75,000 teachers would have received training in the use of ICT in teaching and learning. The main aim of "Preparing Teachers of the Information Society" was to raise the standard of pupils' achievements by increasing the expertise of teachers in the use of ICT in subject teaching. It was an ICT project as well as a school development project, which consisted of the following components:

- in-service training for 75,000 teachers;
- establishment of a people's network which would support the training and would form learning communities which would remain active after the end of the project;
- establishment of local centers which would support the training process;
- creation of mechanisms for the accreditation of training;
- state grants to improve the school's infrastructure and the school's accessibility to the Internet.

The plan had been designed to be decentralised and there were opportunities to shape in-service training at the local level in accordance with the wishes and competence of the participating teachers.

Four alternative training models were offered:

- In-school training, which included face to face training performed either by a member of the school's teaching staff, e.g. the IT teacher or an external trainer. The training content had to meet the specifications published by the Hellenic Pedagogical Institute (H.P.I.). Wherever possible training took place in the classroom or in the school computer lab, so that teachers could try things out as they learned.
- Training by the approved training providers, who had to follow the training curriculum produced by the H.P.I. The training curriculum described the targets of the training process and outlined the skills and abilities expected. It was for the training centers to decide the teaching methods and strategies in order to achieve the described targets.
- Self-learning which would be addressed to teachers who already acquire basic ICT skills and experience in the use of ICT in the learning process and would include exploitation of the provided training material and participation in collaborative projects.
- Web based training provided both by the training providers and the Pedagogical Institute making use of the teachers' training centre operating within the Greek schools network.
- The training process was structured so as to be flexible and capable to accommodate the needs and the existing knowledge of the teacher.

The curriculum of the plan was structured over the three following modules:

Module 1. Training in generic ICT skills

These training programmes intend to improve teachers self-confidence and knowledge as far as the new technologies are concerned. The curriculum of the programmes are designed in order to fulfil the particular needs of the Greek teachers. The training material and the activities designed derive from the schools' daily programme and the particular needs of teachers. The aim of these programmes is to acquaint the teachers with: a) the use of common computer applications (word processor, spreadsheet, browser, e-mail etc) b) basic concepts of ICT c) the use of ICT tools for searching for information, for presenting and communicating ideas and for contributing to their professional development.

Module 2. Training in the use of ICT in subject teaching

During these training programmes teachers are expected to participate in activities relating to the use of ICT as a teaching tool. The curriculum of the programmes are structured over various activities. The activities include the development of lesson plans as well as the teaching process using educational software titles and common applications used in subject teaching. The effective use of ICT in the classroom implies new roles for the teachers, who are expected to act as facilitators of their students' approach to learning. In an attempt to promote and articulate new roles in teaching and learning process, during the implementation of the activities, teachers play the role of the student, having an expert as an instructor.

Module 3. Design and production of educational activities, lesson-plans and scenarios concerning ICT exploitation in classroom

These programmes concern teachers who feel confident in using ICT. In the framework of the programmes, work groups are established, with the active participation of both teachers and pupils, which will implement an interdisciplinary project. The programme encourages project themes, which are of interest to the local societies of the schools, in an attempt to bring schools in touch with the real world. Additionally, schools from remote locations collaborate - using the facilities of GroupWare tools – in developing projects of

common interest. In that way, the programmes are expected to perform as the kick off activity for the establishment and operation of the learning communities.
The project is still active and up to now more than 75,000 Nursery, Primary and Secondary teachers have taken part to the first module of the plan. Moreover an on-line accreditation process is implemented concerning all the participants.

How in-service teacher training is carried out

In 1998 the HPI announced the operation of a web-based distance training center (http://www.pi-schools.gr/hdtc). The implementation was web based, incorporating all the necessary tools for interpersonal communication. The provided services are based on the following three scenarios:

- supported self-training;
- collaborative learning;
- virtual Classroom.

The above services are structured as follows:

- training material (ICT in learning, basic technical knowledge, lesson plans for the classroom use of ICT, educational software, research projects)
- curricula - textbooks;
- discussion *fora*;
- educational links;
- help Desk;
- structured asynchronous web-based courses.

The Hellenic Distance Training Center has been the most famous web spot for all the Greek teachers involved in teaching with the use of ICT.
The National School Network (www.sch.gr) apart from the networking facilities which provides to the Greek schools maintain a web training center where the teachers can find published school collaborative projects, seek partners for projects, take part to discussion fora and find useful educational links. The site is very famous among the school teachers as it acts as the main web-exhibition of school projects and sites.
Recently the web-site of the Ministry of Education announced a new virtual place within its web-site (www.e-yliko.gr). The name of the virtual place translated in English is e-content. In this virtual place teachers can find lesson plans and teaching scenarios in various subjects. The operation of the site is daily supported by a teachers team who have special qualifications gained through the above mentioned E42 project. Although the web site is only a few months in operation, it has become very famous within the teachers' community.
The project "Preparing Teachers of the Information Society" makes use of all the above web-sites both in retrieving training material and in daily training process. Moreover an on-line accreditation process is active for all the participants of the project. Additionally under the curricular framework of the project, special web-based courses are organized focusing on subject teaching using ICT. These courses implement both asynchronous web based modules and group-ware facilities for collaborative work. Finally, project based on-line groups of teachers are organized working around specific cross-curriculum subjects alongside with their students.

Teachers actual competencies and tasks in using ICT

A National Survey concerning teachers' use of ICT is now under process and the results are going to be announced by the end of the year. The following percentages concerning the estimated situation about the actual competencies and tasks of Greek teachers in using ICT,

refer to the unofficial results of the above described Survey, as well as to the reports collected by the regional educational administrators and finally to our ten years experience in teachers' training in Greece. About 15% of the secondary teachers use ICT tools (basically MS – Office Suite) in preparing their lessons. About the same percentage use the Web to retrieve information and download teaching material.
A small percentage about 5% use the school computer lab for teaching purposes (about two to three times in a semester). These teachers mostly use the Web and special educational software titles concerning various teaching subject (mostly Maths, physics, Language and History). As far as Nursery and Primary teachers are concerned the percentages are even smaller as the Nursery and Primary schools have acquired computer labs only the last two years and the teachers have recently participated to the training programmes.
It seems that ICT technologies couldn't manage to rebuild the mind frame and attitudes of the Greek teachers so far, as teachers try to encapsulate ICT to their traditional teaching methods and practices. The main reasons for this situation have to do with the capability of National School Curricula to accommodate ICT based activities, as well as to the fact that the large scale teacher training programmes have concentrated so far only on procedural skills in using ICT.

Problems that teachers face in using ICT in their practice

The following information derive from a National Survey funded by the Hellenic Pedagogical Institute among 900 secondary teachers participated into the project ODYSSEAS. The outcomes of the project have been exploited to the design process of the project "Preparing Teachers of the Information Society".
The major issue appointed, had to do with the fact that teachers even though they participate in a rather sophisticated and articulated training program didn't manage to feel confident in the ICT teaching environment. The majority of them declare that they need farther training and daily support in classroom practice. Specifically, teachers focused on the availability of lesson plans and teaching scenarios. Teachers face serious problems in implementing ICT basic activities in their school practice, as they have to copy with inflexible time schedules defined by the national curricula.
ICT incur major changes not only to the teaching methods and practices but also to the whole school operation and management. Teachers faced many difficulties to adapt to these changes having mostly to do with the role of the IT manager, the management of the computer lab time schedule etc.

Content areas involved in teachers' competencies profile in ICT for education

Tool based approach of ICT:
- Lesson plan design
- Exploratory learning
- ICT in problem solving
- Evaluation of educational software
- Computer mediated collaboration and communication
- Evaluation through ICT
- Web based learning communities
- Integration of ICT into the school environment.

INFORMATION SHEET OF GREECE

	Typology of teacher	Educational level	Model of teacher training	Duration	National standard
INITIAL TEACHER TRAINING SYSTEM	*Pre-primary*	Nursery (age 4-6)	Nursery teachers receive their initial training at the Pedagogical Departments, which have been established to almost all the Universities around the country	4 years	☒ Yes ☐ No
	Primary	Primary school (age 6-12)	Primary teachers receive their initial training at the Pedagogical Departments, which have been established to almost all the Universities around the country.	4 years	☒ Yes ☐ No
	Secondary	Lower secondary school (12-15) Upper secondary school (15-18)	Secondary teachers do not receive any initial training as far as their pedagogical and instructional skills are concerned. They are graduates from various University departments.		☒ Yes ☐ No
	Vocational	Vocational and technical school (age 15-18)	Vocational teachers are mainly graduates at the University Engineering Departments + have attended a special one-year course on pedagogical training (PATES); alternatively they have attended SELETE, a 4-year degree course, in which the pedagogical training is parallel to the technological education in four engineering specialisations (Civil, Electrical, Mechanical and Electronic)	4+1 years or 4 years	☒ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ■ No

ICT IN INITIAL TEACHER TRAINING

Content

Primary teachers:

The Primary Education Departments are independent Academic Departments responsible for the formation of their own curricular framework. Here follow the list of the main basic common axes:

1. Basic Skills in ICT use:
   - Operating Systems
   - Word Processing
   - Spreadsheets
   - Internet and e-mail
2. ICT in Educational process:
   - Educational software evaluation
   - Educational software implementation in daily school practice (Maths, Science, Literature, History, Languages etc).
   - Using Internet and e-mail in classroom
   - Using ICT in educational research
   - Using ICT in educational management

Secondary teachers:

The majority of them don't have any strong pedagogical background. All the University Departments from which the secondary teachers graduate offer ICT basic skills courses. Many of them, especially science and technology departments, offer programming courses or courses concerning ICT applications' use for research purposes. There are a few University Departments, especially Literature, Philosophy and Psychology Departments, which offer lately some courses concerning ICT in education.

Technical and Vocational Teachers: both PATES and SELECTE integrate into their syllabus the following topics concerning ICT in education, apart from a topic concerning ICT basic skills:

- Pedagogical consideration of ICT
- Educational Technology – Multimedia.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

The Ministry of Education is in charge of designing and implementing teacher training policy. For this purpose the following organisations are established:
Hellenic Pedagogical Institute, which is responsible for the auditing of the following described Regional Teacher Training Centres.
The National Teacher Training Organisation responsible for the national policy and designing process as far as teacher training is concerned.
The *Regional Teacher Training Centres* focusing on in-service training of teachers of all the education levels. Three types of training courses are offered:

1. Introduction training courses: these courses are tailored for the teachers who have just started their teaching career and include three phases, which take place during the first year of the teacher's service. The syllabus of the course aims to familiarise the new teachers with the educational reality and to offer basic instructional skills. These courses include also some introductory topics concerning the role of the teacher in the information society.
2. Crash obligatory training courses: these courses focus on specific teaching subjects and techniques and they are used as tools for the dissemination of new curricula, new books, new teaching techniques, policies etc.
3. Crash optional training courses: these courses focus mostly on innovation in teaching and learning specifically as far as the following axes are concerned: Specific Scientific Subjects, Instructional Methodologies, Daily school practice.

Existence of teacher training courses based on ICT? ☒ Yes ■ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

The Regional Teacher Training Centres focus mostly on the teaching skills as well as on the pedagogical and subject background knowledge of the teachers. A number of modules, first introduced in 1996, concerning ICT in education are included:

- ICT basic skills
- Pedagogical Consideration of ICT
- Internet technologies at classroom
- Educational Software evaluation
- Educational Software classroom implementation

In 2000 the Greek Ministry of Education announced a large scale National Plan named "*Preparing Teachers of the Information Society*" concerning teachers in-service teacher training in ICT.
The training process was structured so as to be flexible and capable to accommodate the needs and the existing knowledge of the teacher. The curriculum of the plan was structured over the three following modules:

- Module 1: Training in generic ICT skills
- Module 2: Training in the use of ICT in subject teaching
- Module 3: Design and production of educational activities, lesson-plans and scenarios concerning ICT exploitation in classroom.

The project is still active and up to now more than 75000 Nursery, Primary and Secondary teachers have taken part to the first module of the plan. Moreover an on-line accreditation process is implemented concerning all the participants.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

Teacher training is the largest segment of higher education: about one third of the total number of students used to be enrolled at one or another teacher degree course, while at present this proportion fell to about one quarter of all students in higher education, due to the significant increase of student numbers in other areas over recent years. Teacher training (or education of the type) is currently pursued by about half the institutions of higher education (33 out of a total of 65, and 27 out of the 30 institutions maintained by the state). Teacher training is a generic term meaning the entirety of higher education degree courses where higher educational and vocational qualifications enabling one to work as a teacher can be obtained. According to the type of qualification obtained, we distinguish the training of pre-primary teachers (*óvodapedagógus*), primary school teachers (*tanító*), lower secondary (*tanár*), and upper secondary school teachers (*középiskolai tanár*), special education teachers (*gyógypedagógus*), and trainers, (*képz_ személy*), as well as other training of educational nature (e.g. in pedagogy and social pedagogy).

Andrea Kárpáti
Eötvös University

Andrea Kárpáti is an educational researcher and UNESCO Chair for ICT in Education at Eötvös Loránd University, Faculty of Sciences. She is Chief Editor for a series of textbooks entitled "Teaching with ICT" and has been the Hungarian senior investigator of several EU and OECD projects on ICT competencies and educational programmes aimed at creating equity through ICT.

The training for educational work at pre-primary educational institutions, require courses conferring a college degree and qualification as a pre-primary teacher (pre-primary teacher and ethnic pre-primary education teacher). A pre-primary teacher is a professional qualified in such degree courses for educating children between the ages of 3 and 7.

Training providing a college degree and qualification as a primary school teacher (*tanító*), ethnic primary school teacher (*nemzetiségi tanító*) or therapist primary teacher (*konduktor-tanító*), Primary school teacher training courses give preparation appropriate to all subjects in grades 1 to 4 and to one chosen cultural domain of education for grades 5 and 6 of the single structure school (*általános iskola*); ethnic primary school teacher training for teaching grades 1 to 4 in classes speaking a particular ethnic language; and conductive primary school teacher training for teaching and education in special needs education schools. A primary school teacher (*tanító*) is a professional qualified in degree courses for comprehensive teaching and education in grades 1 to 4 and, depending on the actual branch of teacher training, either a cultural domain in grades 5 to 6, or an ethnic language, or special needs education.

The term 'school teacher' (*tanár*) refers to two groups of professionals. The first group of teachers who perform instruction and education from grade 5 to grade 8 in single structure primary education (*általános iskola*), in practice, yet they are qualified, in principle, to teach up to grade 10 (up to age 16) by a college (*fõiskola*) level degree. The second group of professionals who perform instruction and education in grades 9 to 12 (up to age 18), in practice, in secondary level educational institutions leading to the secondary school-leaving examination (*érettségi vizsga*), yet, in principle, qualified to teach from grade 5 to 12 by a university (*egyetem*) level degree. These second group of teachers provide the foundations of general knowledge education and participate also in vocational training by performing one or more specific subject matter instruction according to their initial specialisation of study.

Special teacher training includes, on the one hand, the training of special needs education teachers (*gyógypedagógus*) and, on the other, those that cannot be ranked in any category e.g. that of dormitory governors (*kollégiumi nevelõtanár*), social pedagogues, and the training in the subjects of psychology and pedagogy. In the training of special education teachers (*gyógypedagógus*), specialisation is determined by the type of disability involved, while in the category of other teacher training courses, it is determined by the nature of the pedagogical task.

Initial teacher training: curricular framework of ICT for education

ICT FOR NURSERY AND PRIMARY SCHOOL TEACHERS

As indicated before, these two educational degrees (equivalent of B.A.) are given by colleges and college level university faculties. Both have been offering compulsory courses in educational technology for decades. ICT is introduced as one of the fields in educational technology. Curricula are defined by universities but national requirements for the certification of teachers have to be observed.

Optional courses in educational applications of ICT are also being offered as kindergarten and junior primary school experiments with ICT use are gradually gaining importance (the introduction of ICT to Hungarian schools targeted senior primary and secondary school levels in the 1990s – a trend that has gradually changed to involve younger students).

Duration of both courses is one semester; they are practice-oriented with hands-on workshops on the use of equipment. They both require the submission of a term paper as a demonstration of understanding of didactic methods of educational technology and ICT respectively. Apart from these, students may – but are not required – to study basic ICT use at optional introductory courses. As more and more students come to college with high level ICT competencies gained at primary and secondary school (ICT being a compulsory discipline for a minimum of 4 years at primary and 3 years at secondary level) these courses are offered at different levels. Advanced ICT education at colleges involves the adaptation and even design of simple educational software with the help of editor systems and the use of digital content databases.

ICT FOR SECONDARY SCHOOL TEACHERS

As mentioned in the introductory, secondary school teachers are trained at M.A. level at universities. Curricula are defined by universities but national requirements for the certification of teachers have to be observed. Educational technology is a compulsory discipline at all universities and ICT is a significant part of the programmes. The course lasts one semester and a term paper (often a digital or paper-based or film-based teaching aid or presentation) is required. Generally, curricula are divided between "traditional" and "new" educational tools and the latter involve the following topics, taught in about 50 % of total course time.

Computer use for education, communication and school management:

- Word processing: production of tests and other teaching aid
- Production of presentations and other illustrative materials
- Using communication and management platforms
- Educational software assessment and use.

Digital image production and processing:

- Digital photography (at some institutions, also film making)
- Image processing (scanning, texting, sound, altering/combining images, etc.).

An interesting model for combining education in traditional and novel teaching aids and related educational methods has been developed at Eötvös University, Faculty of Sciences,

Budapest, the largest teacher training programme of the country. After introductory lectures on new trends in educational technology and their implementation, a modular structure is employed for hands-on activities and all topics are offered at initial and advanced level. For example, ICT use involves modules ranging from the use of basic Office software to Flash programming. Also digital imaging and development of paper-based teaching aids are offered at different levels. Students are required to visit introductory lectures and choose from each module the one best suited to their level of abilities and interest. The term paper comprises a test and the production of teaching aids from all modules chosen.

"ICT in Education" as a discipline is compulsory at major universities and optional at others. In both cases, several course options are offered to satisfy the needs of the beginner and advanced PC user as well as those with a theoretical or practice-oriented interest. Here is a list of the most frequently offered courses:

- Basic computer use: hardware and office software.
- Basic Internet use: information search, retrieval, processing and presentation.
- Advanced computer use: basic programming skills, use of multimedia editor software products and advanced features of word processors, creating a web site.
- Advanced Internet use: targeted search, using digital libraries and educational databases, downloading and processing different file formats, creating a web site.
- Use of software products especially relevant for education, e.g. CABRI Geometre, SPSS statistical package, Newton virtual laboratory, etc.
- Collaborative learning: organisation of teaching and learning in a virtual learning environment or microworld.
- Distance education – tools and methods: teaching and learning online, structure and functions of most popular in Hungary distance learning environments.
- Digital imaging: production of digital films and videos: shooting, editing, sound, special effects, texting, and reproduction.

EDUCATIONAL TECHNOLOGY AND ICT EMBEDDED IN A CURRICULUM AREA

Digital teaching methods are also featured in courses of didactics of different disciplines. College and university students may choose to specialise in one, two or – in exceptional cases - three school disciplines. All teacher-training programmes contain a discipline-based didactics component with 2-3 courses of 1 semester each and a 6-8 week long teaching practice executed at laboratory schools. Lecturers of didactics usually include the following information in their courses:

- Educational software for the specific discipline.
- Subject-specific software and applications of software developed for different use for educational purposes (e.g. Microsoft Office applications in maths and physics, word processors in creative writing tasks for mother tongue and foreign languages, digital dictionaries and other reference material in all disciplines, databases in art, history and literature, etc.).
- Relevant web sites for the given discipline and related knowledge areas.

How initial teacher training is carried out

Academic work management: registration for courses and examinations, changing study areas and examination times for students, advertising courses, accepting students for them, registering term paper grades and offering examination times as well as registering exam grades for teachers are done online at practically all Hungarian institutions of Higher Education. There are two major systems used and developers for both are

currently working on supplying all e-Learning functions or at least digital testing facilities to these educational management systems.
Initial teacher training in Hungary is carried out basically in a traditional, F2F framework. However, more and more colleges and universities introduce blended learning methods to enrich and support F2F courses. Methods involved are as follows:

- Development of a course web site complete with notice board, library, forum and submission of tasks functions.
- Mentoring students through e-mail, mailing list or chat forum.
- Introduction of digital teaching aids (on CD-ROM or provided online) and Internet resources for course work.
- Using virtual laboratories and other collaborative platforms (also during F2F lectures and seminars).
- Taking an assessing tests online.
- Allowing or even encouraging electronic submission of course work.
- Publication of student work as best practice (with author's consent) online.

In-service teacher training: objectives, subject areas and bodies

In-service teacher training, in broad interpretation, includes all forms of training from those not resulting in a certificate or diploma, done by self-study, organised individually or by the school to those programmes that are provided at higher education institutions and result in a further teacher qualification.
Herein, the forms of training within the stricter sense of the term will be treated, i.e. those provided by an institution entitled to offer in-service training of a longer duration (exceeding 30 hours), and in addition, in-service training in higher education for the purpose of obtaining a diploma. According to the Government Decree concerning In-service Teacher Training, the in-service training mandatory for every seven years may be acquired, apart from the accredited programmes, by passing the teachers' post-professional examination, as well as by acquiring diplomas from new graduate degree programmes or in-service training in the original professional orientation or doctoral (PhD) programmes, or by acquiring any other higher level professional qualification that is of use to teachers and is recognised by the state (listed on the National Register of Qualifications - *Országos Képzési Jegyzék*), or a language examination recognised by the state. It is also possible to meet the requirements of mandatory in-service training by participating in training organised by the Council of Europe or devised on the basis of bilateral inter-governmental working plans. However, the state budget support allotted to schools for this purpose - calculated on the basis of the number of teaching staff - is sufficient only for the mandatory 120 hours of in-service training. Thus, teachers participating in in-service training must frequently pay the much higher costs of programmes providing a new diploma or professional qualification by themselves - since state funding is not available for the acquisition of further qualifications with a few exceptions -, if the school is unable to provide funding from the in-service training allotment or some other resource of its own budget.
Formerly, on the basis of a decree of the Ministry of Culture and Public Education (ineffective after 1996), higher education institutions were allowed to pursue intensive in-service training of 120 hours, attested initially by a diploma and subsequently by a certificate. At present, this is no more possible. In-service training courses that are acknowledged by a certificate are organised by institutions entitled to provide in-service training. Accreditation can be asked for at a government agency for accreditation.
Specialised in-service programmes (*szakirányú továbbképzés*) in higher education are forms of training at a university or college founded as an in-service degree programme, resulting

in a diploma. According to the Act on Public Education, the establishment and launching of specialised in-service degree programmes (*szakirányú továbbképzés*) is possible after a procedure similar to that of founding graduate degree programmes: accreditation of specialised in-service trainings is also in the authority of the Hungarian Accreditation Board (*Magyar Akkreditációs Bizottság*), which continuously evaluates the applications submitted by teacher training institutions to establish specialised in-service degree programmes (*szakirányú továbbképzés*), i.e. to have the qualification requirements codified in a decree. The qualification requirements for the first specialised in-service degree programme (public education management for teachers) were codified in 1997, and four training institutes simultaneously applied for and received licences to launch such courses. The amendment of the Act on Higher Education in 1999 simplified the launching of such degree programmes: rather than entailing a procedure pending on an accreditation process and the issue of a ministerial licence, such trainings may be launched by higher education institutions - in their own authority - entitled to launch graduate degree programmes in the same field of specialisation. They are obliged to report the event of launching, and on the basis of these reports, the Official Journal of the Ministry of Education bi-annually publishes the list of institutions launching specialised in-service degree programmes. By 2002, about 57 different specialised in-service degree courses were established, based on the graduate teacher education degree programmes (including those not solely available to teachers, but providing knowledge that can be utilised in public education and child protection institutions). By 2002, there were 22 institutions entitled to provide teacher training who had announced the launching of one or more of these degree courses (five per institution on average).

In-service teacher training: curricular framework of ICT for education

All teachers in Hungary have to undergo 120 lesson hours of in-service training (taking a few long or several short courses that add up to this figure) once every seven years. Major accredited course providers are:

- The Hungarian Schoolnet (www.sulinet.hu), that offers basic and advanced, discipline based training related also to its international activities (co-operation with the European Schoolnet, the ICT Expert Group of the European Union and OECD research projects).
- ISZE (Association of Teachers of IT, www.isze.hu).
- Universities and colleges.
- Private training companies and infrastructure providers.

Topics for basic computer skills courses involve the same topics as are included in pre-service training programmes (see details above):

1. Basic computer and Internet use
2. Advanced computer and Internet use
3. Use of software products especially relevant for education
4. Collaborative learning tools
5. Distance education – tools and methods
6. Digital imaging.

Topics for advanced computer skills courses also involve the same topics as are included in pre-service training programmes with emphasis on previously gained educational experiences of practicing teachers (see details above):

- Educational software for the specific discipline
- Subject-specific software and applications of software developed for different use for educational purposes
- Relevant web sites for the given discipline and related knowledge areas.

How in-service teacher training is carried out

There are five types of in-service training courses for teachers on ICT:

- F2F work in the trainig lab of the course provider: lecture followed by hands on activities. Mentoring through e-mail between sessions.
- F2F courses at schools, organised by the Association of Teachers of IT or a local course provider. The IT teacher and system manager of the school is involved in the training.
- Blended learning courses: F2F lectures at start and F2F examination sessions, teaching and mentoring done in a virtual learning environment (VLE).
- Blended learning courses attached to an innovation project: participants of the course are involved in a teaching experiment and will use knowledge gained in a mentored innovation environment (The optimal way to train teachers to actively employ ICT in teaching).
- Distance learning courses - a rarity, as most teachers prefer to have practice with an on-site mentor.

Teachers actual competencies and tasks in using ICT

From the late 1980s, according to requirements of the Hungarian National Curriculum, ICT has to be taught as a compulsory discipline for students aged 13-18 in one weekly period (45 minutes). ICT is taught according to a Ministry of Education approved curriculum - the most recent version, the Frame Curriculum, approved in Spring 2001. Therefore, younger teachers have entered the profession with profound basic skills and middle-aged colleagues in all schools can rely on support from the ICT specialist and his/her student assistants. As for teachers' skills and competencies, two major national surveys have been conducted in the past 3 years, the data of which will be used further for questions 3.4 and 3.5:

- the Hungarian assessment project of OECD's *"ICT and the Quality of Learning"* (2000-2002, to be referred to as *OECD-Hungary survey*) involved 120 schools with about 270 **secondary school teachers** participating in the survey representing the 8 geographical areas of the country. The study was conducted by Andrea Kárpáti, Eötvös University, Faculty of Sciences, UNESCO Centre for ICT in Education. References in footnote.[1]
- Our National Institute for Educational Research conducted an evaluation of ICT skills and competencies of **primary and secondary school teachers** involved 870 teachers representing primary schools in Pest county in 1999-2000 (to be referred to later as IER - Hungary survey). The project was coordinated by Éva Tót, (present name of the institution: National Institute for Research on Higher Education). Reference in footnote[2].

Table 1
Which application can You use? (Results in %, sample excludes ICT teachers)

Application	IER-Hungary	OECD-Hungary
Word processor	94,3	100
Database and charts	59,2	85
Internet	48,0	75
E-mail	40,2	100
Graphics software	22,2	28
Other (virtual lab, simulation, distance learning environment)	7,5	65

IER-Hungary survey, N=839, OECD-Hungary survey: N = 270

1. Cf. The following English language publications by Andrea Kárpáti:
ICT and the Quality Of Learning at Hungarian Schools - Results of the OECD Study, In *Proceedings of SITE* (2003), New Mexico, USA.
ICT And The Quality Of Teaching - Some Hungarian Results Of The OECD ICT Project, in Hogenbirk P. Ed (2003), *ICT and the teacher of the future*, Amsterdam, Kluwer.
Third generation pioneers, ICT culture in Hungarian education at the end of the second millennium, *International Journal of Education, Communication and Information (EcI)*, 2004/4.
ICT and the quality of teaching - some Hungarian results of the OECD ICT project (2002), *Proceedings of the IFIP Open Conference*, Dortmund.
ICT and the quality of learning at Hungarian schools -results of the OECD study (2003), Davis N. Ed., *Proceedings of the AACE - SITE 2003 Conference*, New Mexico.

2. Éva Tót published results of the survey in several Hungarian language publications between 2000-2002. English language summary may be obtained from the author through e-mail: toteva@chello.hu

Table 2
For which school functions do You use ICT applications? (Results in %, sample excludes ICT teachers)

Function	Never use it	Rarely use it	Regularly use it
School administration	17,6 (8,5)	44,2 (35,0)	38,2 (56,5)
Preparation for teaching	22,2 (12,4)	48,8 (37,6)	28,9 (50,0)
Communication	37,8 (14,5)	34,4 (17,2)	27,8 (68,3)
Self improvement, info retrieval	25,5 (16,3)	52,9 (32, 6)	21,6 (48,9)
Playing games	25,0 (26,3)	56,9 (58,2)	18,1 (15,5)
Teaching	61,0 (17,4)	28,4 (46,8)	10,6 (44,2)

IER-Hungary survey, N=839, OECD-Hungary survey: N = 270 (numbers in brackets)

In the OECD-Hungary study, we found that, for the majority of teachers, ICT was the medium used mostly for lesson preparation. During classes, ICT was used regularly by only about 15% of the model school teachers and 5% of teachers at average schools. Those using computers employed digital teaching aids or presentation devices one period a week (that is, 45 minutes) for one class. 70% of teachers at model schools, however, used the computer for preparation and communication. They spent about 5 hours per week word-processing their tests, notes and overhead sheets. Flowcharts were used by 5% of teachers who spent about 3 hours per month producing them. Browsing the Web for information was done by 50% and required an average of 8 hours weekly. Educational CD-ROMs were used by 10% of teachers. They spent about 5 hours monthly selecting materials from CDs for classroom use. 70% of teachers used computers for communication and spent about 5 hours per week word processing. 6% were regular e-mail users and sent/received mail for about 3 hours per week. Some teachers developed unique disciplines to teach new skills. These special ICT applications also helped students integrate their studies and ICT skills development. It is generally believed that younger teachers are more likely to adopt new teaching methods and tools than their older colleagues. In the OECD-Hungary survey, our results disproved this claim. Major PC users were in their mid forties and an art teacher who became a national authority on software useful for secondary level art education was well into her fifties when she first sat in front of a computer. ICT specialists were instrumental but there were teachers of different age groups and disciplines right at the start of the computerisation process. Women teachers seemed to be as active computer users as men and no significant sex differences in school use of ICT were observed among students either (preferences for war games versus fashion web sites are evident but, in our opinion, do not reflect different patterns of PC use). A distinguished staff member, the leader of the extremely popular visual arts specialisation programme at HU05, learnt to handle graphics and CAD programmes in her fifties and started teaching them at once. Her art curriculum was an excellent example of the synergy of traditional and ICT-based creative methods.

Special incentives to develop computer skills and acquire new educational practices were surprisingly rare to find in the schools participating both in the IER-Hungary and the OECD-Hungary surveys. The school management at many schools was constantly applying for grants to pay stipends for those who do extra work for the spread of ICT culture. Participation at conferences, while also enjoyable social events for country schoolteachers who unfortunately lack chances for frequent encounters with colleagues, were encouraged and very often paid for by the school. There seemed no need for incentives other than a chance to participate in supported ICT training courses in the model schools studied, as interest among staff members and students had been high right from the start. The real incentive for teachers was high quality computer use supported by the school: better access, home use of a school computer or self-selected, high level training.

Many of the teachers interviewed declared that the functioning of their school was largely

dependent on the proper functioning of the PC network. Most teachers became so used to computers for communication and information retrieval that they would consider the breakdown of the system a major obstacle. Another important agent of change turned out to be bilingual education. English language teaching aids (produced both in the UK and US) were in regular use and many were supplemented by CDs and web sites. On-line assessment was still rare in Hungary at the time of our survey (2001). Several large databases containing tens of thousands of reliable and valid test items were elaborated but not yet open to public use. Software products contained assessment elements but in most cases these were not suited to the Hungarian national curriculum needs. Thus many teachers who would be interested in trying out a test bank to develop responsive assessment instruments used ICT basically for searching for and presenting learning content.

Even in the ICT model schools, most informal inter-staff communication was found to be being done verbally, at regular meetings of teams of teachers. Frequently held staff meetings offer a lively forum for discussing urgent management matters as well as continually refining the school's educational philosophy and practice. Official communication between the leadership and staff had been, however, computer-based from the day the internal networks became functional.

The home page of the typical Hungarian secondary school is a daily updated source of information for school-based and national activities: competitions, sports events, etc. However, in many cases, paper-based alternative sources of information are available and thus the home page will be used by outsiders looking for information about the school or parents in search of an important date their child forgot. Students make more regular use of the Net than teachers to find out what is going to happen at school and in the neighbourhood.

Problems that teachers face in using ICT in their practice

According to interviews made with the school Principal, ICT specialists and other teachers in the OECD - Hungary survey quoted above, no one seemed to doubt the importance of ICT for school reforms and beneficial effects on teaching and learning. Even teachers with low level ICT skills were convinced about the progressive role of ICT for teaching and school life in general. Building a team spirit was found to be one of the most important added values of introducing ICT in all areas of school life. Many teachers remarked that pair and group work were especially effective methods for computer-based tasks as they teach task management skills, evolves team spirit and are in line with the Net Generation idea of collective ICT use. Task sharing and discussion of results through e-mail and real-time, person-to-person communication, assembly of project components and presentation of results are skills of high importance for the world of work. ICT acts as a catalyst for all these skills and thus promotes learning new working methods while also acquiring new teaching content.

The role of the school leadership seemed to be extremely important, in fact, we found it crucial from the start of the innovation processes in both the OECD and the IER surveys. Principals were instrumental in grant applications and managed them to successful completion. They usually hand-picked their deputies and staff on the basis of interest in computer-assisted education, established a network of supporting university chairs and industrial companies and ensured that results achieved be presented at regional and national conferences for discussion and adaptation. Important figures in most ICT teams were the school librarians and the maths and science teachers who usually belonged to the initiators or first supporters of the ICT-based reforms.

Ever since the beginning of computerisation of Hungarian schools, ICT teachers have generally been required to fulfil the role of the systems operator and help colleagues acquire ICT skills. This job is still not included in the official list of occupations thus school

management can only employ a sysop "under disguise", for a different position. Without a permanently employed specialist, no PC system is likely to function for long.

Teacher training seemed to be the most important factor mentioned by staff members and parents alike during interviews at the schools studied as a key to successful reforms. Trained teachers are more likely to be educational computing innovators and adapters but sometimes even hardware innovators and educational software designers are found among them. At three of the six schools evaluated, successful implementation of ICT depended both on an exceptionally good infrastructure and the simultaneous training of most staff members in its use. For several teachers, ICT clearly contributed to raising their professional level of excellence. They (teachers of Science and Foreign Languages especially) were convinced that ICT skills were beneficial for their professional development. They were intent on improving their teaching through regular use of ICT. Teachers of other disciplines, however, demonstrated varying amount of readiness and willingness to adopt the new educational culture. Evidently, pre-and in-service training courses for teachers of all disciplines – on a compulsory and government-supported scheme from 2002 – have been and continue to be instrumental for the success of ICT-based reforms.

Content areas involved in teachers' competencies profile in ICT for education

Content Area 1: *Critical-situational*

Educational technology in School innovation
Educational technology and Learning/teaching Processes
Disciplines and ICT
Learning environments and ICT
Collaborating and learning on-line
Evaluation and ICT
Role of ICT in the integration of disabled students
School management and ICT
In-service training and ICT

Content Area 2: *Conceptual*

Special ICT competencies and skills necessary for teachers
Teaching concepts and paradigms to be utilised in an ICT-enriched environment

Content Area 3: *Techno-pedagogical*

Optimal and minimal school infrastructure for ICT use
Optimal placement of PCs and other equipment in a computer lab for ICT training, in a computer training lab for given disciplines (E.g. sciences and humanities)
Optimal placement of PCs, other teaching-learning infrastructure and furniture in a classroom used for teaching a variety of disciplines

Content Area 4: *Instrumental*

Optimal configurations for discipline-based ICT – supported education and for teaching ICT as a discipline

Content Area 5: *Self-reflection*

Self-assessment methods for teachers in an ICT-enriched environment: digital portfolios, log analysis, evaluation of student use of facilities (e.g. educational portal by teacher, forum for discussion, online mentoring)

Content Area 6: *Collaboration*

Initiating, supervising and assessing digital projects
Online mentoring – teacher and student skills and optimal working methods
Using real time electronic communication (chat, web cam, audio broadcast etc.) for interactive, differentiated, situated teaching and learning

INFORMATION SHEET OF HUNGARY

INITIAL TEACHER TRAINING SYSTEM

Typology of teacher	Educational level	Model of teacher training	Duration	National standard
Pre-primary	Pre-primary school (age 3-6)	College degree	3 years	☒ Yes ☐ No
Primary	Primary school (age 6-10/12)	College degree	4 years	☒ Yes ☐ No
Secondary	Single structure Primary school (11-14/16)	College degree	3 years	☒ Yes
	Secondary school (15-18)	University degree	4/5 years	☐ No
Vocational				☒ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

Pre-primary and primary teachers

Compulsory course in "Educational Technology" (one semester) + optional course in "Educational applications of ICT"

Upper secondary teachers

1. "Educational Technology" is a compulsory discipline at all Universities (one semester). Contents deal with both the traditional educational tools and the new ones, the latter involving the following aspects:
   a. Computer use for education, communication and school management:
      - Word processing: production of tests and other teaching aid
      - Production of presentations and other illustrative materials
      - Using communication and management platforms
      - Educational software assessment and use
   b. Digital image production and processing:
      - Digital photography (at some institutions, also film making)
      - Image processing (scanning, texting, sound, altering / combining images etc.)
2. "ICT in Education" as a discipline is compulsory at major Universities and optional at others. Most frequently offered courses:
   - Basic computer use: hardware and office software
   - Basic Internet use: information search, retrieval, processing and presentation
   - Advanced computer use: basic programming skills, use of multimedia editor software products and advanced features of word processors, creating a web site.
   - Advanced Internet use: targeted search, using digital libraries and educational databases, downloading and processing different file formats, creating a web site.
   - Use of software products especially relevant for education, e.g.: CABRI Geometre, SPSS statistical package, Newton virtual laboratory, etc.
   - Collaborative learning: organisation of teaching and learning in a virtual learning environment or micro-world.
   - Distance education – tools and methods: teaching and learning online, structure and functions of most popular in Hungary distance learning environments.
   - Digital imaging: production of digital films and videos: shooting, editing, sound, special effects, texting, and reproduction.
3. Digital teaching methods are also featured in courses of didactics of different disciplines. Lecturers of didactics usually include the following information in their courses: Educational software for the specific discipline; Subject-specific software and applications of software developed for different use for educational purposes; Relevant web sites for the given discipline and related knowledge areas.

Focus of training pertaining to ICT for education

☒ use of applications (personnel utilities)
☒ digital literacy
☒ specific subject
☒ use in classroom
☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM	120 hours of training are compulsory every 7 years. There are institutions entitled to offer in-service training.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

Topics for basic computer skills courses involve the same topics as are included in initial training programmes (see details above):

- Basic computer and Internet use
- Advanced computer and Internet use
- Use of software products especially relevant for education
- Collaborative learning tools
- Distance education – tools and methods
- Digital imaging

Topics for advanced computer skills courses also involve the same topics as are included in initial training programmes with emphasis on previously gained educational experiences of practicing teachers (see details above):

- Educational software for the specific discipline
- Subject-specific software and applications of software developed for different use for educational purposes
- Relevant web sites for the given discipline and related knowledge areas.

Focus of training pertaining to ICT for education

☒ use of applications (personnel utilities)
☒ digital literacy
☒ specific subject
☒ use in classroom
☐ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

A general course (concurrent model) which leads to a B.Ed. degree for teacher trainees who intend to teach at the compulsory level (primary and lower secondary level) takes three years (90 credits). This course is offered by two institutions: Iceland University of Education and the University of Akureyri. Iceland University of Education also graduates teachers through a distance educational programme which takes four years. To qualify as a teacher at the upper secondary level 30 credits in pedagogy and didactics are required in addition to a B.A. or B.Sc. degree as a minimum (consecutive model) or a diploma in vocational training. Three schools offer programmes of study that give such qualifications: the University of Iceland, Iceland University of Education and the University of Akureyri. Teachers who have completed these programmes are also qualified to teach at the lower secondary level.
Many of the teachers at the university level seek their education abroad. Senior lecturers and professors at institutes of higher education have a Ph.D., other university teachers are usually required to have at least an M.A. or comparable education in their subject.

Kristín Helga Gudmundsdóttir
Department of Continuing Education, Iceland University of Education

Kristín Helga Gudmundsdóttir is Project Manager in Continuing Education at the Department of Continuing Education of Iceland University of Education. At present she is manager of NERA (Nordic Educational Research Association).

INITIAL TRAINING FOR PRE-PRIMARY SCHOOL TEACHERS

The initial training for pre-primary school teachers at Iceland University of Education (IUE) is three years (90 credits) leading to a B.Ed. degree. Iceland University of Education also graduates pre-primary school teachers through a distance learning programme which takes four years. These courses of study are academic and practical.
The 3 year pre-primary school teachers' programme at Iceland University of Education consists of training in social science subjects (909 lecture hours). Subjects taught include Psychology, Pedagogy, Sociology, Icelandic, History of Education, Health studies, Nutrition Science, Ecology, Family Law, Children's Literature, Music, Drama, Art, Children's Drawing, Puppetry, First Aid, theme studies and vocational training. The IUE emphasises the importance of combining theoretical knowledge and methodological training in educational institutions. These practical training is about one third of the entire course.
The Educational Department of the University of Akureyri offers a three year course (90 credits) leading to a B.Ed. for students wishing to become pre-primary school teachers. In their first year most courses are the same as those for students taking an initial teacher training course as compulsory teachers. The course of study is both academic and practical. Emphasis is however placed on the following: working methods; the importance of play in the education and the development of the child; the interrelation of the arts to other activities carried out at the pre-primary school; field trips; education on the environment and the nature; the interrelation between various activities carried out at pre-primary school and the theoretical knowledge of the student.
For pre-primary school teacher trainees, practical training takes place in pre-primary schools, school day-care centres or other educational establishments where the trainees are monitored by a supervisor.

INITIAL TRAINING FOR COMPULSORY SCHOOL TEACHERS

A general course (concurrent model) which leads to a B.Ed. degree for teacher trainees

who intend to teach at the compulsory level (primary and lower secondary level) takes three years (90 credits). Subjects within the teacher training programme at the Iceland University of Education are divided into three groups: pedagogy, didactics, and electives. The course in pedagogy mainly includes educational studies, the history of education, the sociology of education, educational philosophy, psychology, education theory, curriculum studies, the making of educational materials, teaching techniques and methodology. Areas of Information and Communication Technology (ICT) are compulsory in initial teacher training. The aim of the course is both to enlarge the personal knowledge that the teacher trainees have of ICT and to focus on particular teaching applications. A two credit course in ICT has been compulsory for a few years and in the school-year 2003-2004 10 credit course in ICT have been added to the core curriculum. Management and administration is in many ways included in several courses. Areas which are compulsory are organizational skills, time management and public relations. Integration of children with special needs is included in a compulsory four credit course Teaching and Learning. During the final year of the course students complete a final essay on a pedagogical or an educational project of their own choice. The course in didactics emphasises the importance of introducing students to the nature and content of education at all the stages of compulsory school. Special attention is given to Icelandic, mathematics, arts and crafts subjects and environmental studies and to the different working methods that apply in the various stages of compulsory school. In the curriculum for the general training of teachers the aim is to link special education to all the main aspects of the course. Students are also given some opportunities to deepen their knowledge of the tasks that come under compulsory education through individual projects of their own choice.
Teaching practice is an important part of the didactics course, and care is taken to make certain that students become familiar with school activities and teaching at all levels of compulsory schooling.

INITIAL TRAINING FOR UPPER SCHOOL TEACHERS
At the University of Iceland there is a one year programme (30 credits) that qualifies teacher trainees who have as a minimum a B.A. or a B.Sc. degree. The programme centres around courses on general educational theory, educational psychology, the educational theory of individual subjects, the sociology of education, developmental psychology, as well as studies relating to upper secondary schools, electives and practical training. This education qualifies the students to teach both at the compulsory and the upper secondary levels. Their preparation as teacher trainees, however, is geared to the last three years of compulsory school (lower secondary education) and to upper secondary school.
The course of study in education that leads to full qualifications for unqualified teachers at the upper secondary level at the Iceland University of Education is a 30 credit programme. It is a part-time course carried out over a period of two years. The programme is mainly based on courses in group dynamics, group psychology, the history of education, education and the community, methodology and statistics, educational theory, teaching techniques, educational psychology and developmental psychology, in addition to teaching practice. A similar programme is offered at the Education Department of the University of Akureyri.

Initial teacher training: curricular framework of ICT for education

Referring to the Icelandic national curriculum published in 1999, the use of ICT as a learning tool across the curriculum is stressed and IT skills should be considered in that context not as a special subject. Therefore it is expected that the universities in Iceland offer courses in educational technology in teacher training. Each university has its own syllabus independent from the Ministry of Education.

ICT FOR PRE-PRIMARY SCHOOL TEACHERS

As mentioned above the Icelandic national curriculum emphasises on that all children should be introduced to ICT in pre-primary school. The Iceland University of Education will in the autumn 2004 offer an obligatory course in ICT in the first semester for pre-primary teacher trainees. The name of the course is Information Technology. The main subjects are the same as the obligatory course in ICT for primary and secondary school teacher trainees. The main topics are:

- Building knowledge of the main areas of computer use in schools as well as the possibilities that information technology offers in communication, resource-searching, registration/indexing, processing data, presenting different material, exercising, learning and teaching.
- Being competent users of some specific tools that can be used, performing the tasks mentioned in former paragraph, developing a progressive attitude towards tasks and gain competency in using the technology in different situations in learning and teaching.
- Exploring the effects of new technology on culture and society, education and children's conditions for growing up. Learning to know theories on learning and teaching with ICT and form their own ideas about the organization of schools, learning and teaching with ICT (Jóhannsdóttir, 2003).

Since 1999 a three credit elective course has been offered in multimedia technology. Students learn how to make a Web site, create digital portfolios on the Internet, use tools for mediation of pictures and learn theories about how to use ICT with children. At the beginning the pre-primary teacher trainees learning through a distance learning course are offered non credit course in how to use the Web, e-mail, information resources on the Internet, Web-based systems and videoconference.

The Educational Department of Akureyri offers obligatory courses in multimediatechnology. Students learn to make educational web sites, to use tools for mediation of pictures and sound and they learn how to take videos and make educational material. Elective courses in ICT is offered for e.g. the following subjects: how to use common programs for example educational computer programs, communication programs, programs to search information and Web-based environment on the Internet.

ICT FOR PRIMARY AND LOWER SECONDARY SCHOOL TEACHERS

Since 2001 the Iceland University of Education has offered 2 credit that are obligatory courses in ICT. In addition ICT is one of nine specialization areas that students can select and they can choose up to 15 credits. Five courses give 3 credits each. The objectives for the ICT-specialization is to educate teachers who are competent users of ICT and are able to organize and perform school tasks and integrate ICT with other school subjects. The courses offered are:

- Information-technology and school work: technological competency, technical literacy and ICT in schools.
- Learning environment: possibilities of the web in distributed and flexible learning and teaching is studied. Teacher students learn to use some course-ware commonly used in distance learning and teaching (e.g. WebCT).
- The knowledge-society: education, learning and schools in the information society. Students evaluate e.g. educational computer programs and computer games and webs for children. Learning tasks are intended to intertwine organization of teaching and knowledge about digital material available for contemporary children.
- Production of educational material and media: ICT-use and multimedia-technology. Students learn to use tools for mediation of pictures and sound to make educational material. They are supposed to learn some basic principles of media and presentation and

build on learning theories when constructing educational material (Jóhannsdóttir, 2003). Students can choose elective courses in ICT-related subjects. These educational courses are for example mathematics and ICT, ICT and language teaching and computer and music.
The Educational Department of the University of Akureyri offer obligatory course in Educational Curriculum and part of the course is ICT. The students learn to make educational websites, learn to use blog-sites on the Internet, learn about cooperative tasks on the Internet like Kidlink. They learn how to use web-log, evaluate educational computer programs for children and make educational material and media.

DISTANCE EDUCATIONAL PROGRAMME
Iceland University of Education and the Educational Department of the University of Akureyri graduate teachers through a distance education programme. Students in distance education programmes generally complete most of their courses independently using computer technology and the Internet. All distance education programmes, however, also include some on-campus activities. More than half of the students at the Iceland University of Education are in distance education programmes. The universities offer elective courses in ICT for distance initial teachers trainees at the beginning of their studies. The students learn how to use the computer, computer programs and how to use distance educational environments and closed course-ware like WebCT. The same ICT courses are offered on-campus students and in the distance programmes. The distance students are in many courses asked to write a log book to map their learning processes and enhance their meta-cognition as students. A few teachers have made experiments to use open blog-sites (web-log) on the web for that purpose (Jóhannsdóttir, 2003). Most courses both in distance program and on-campus have their own websites.

TEACHER LICENSE PROGRAMME
The Iceland University of Education, the Educational Department of the University of Akureyri and the University of Iceland offer 30 credit programmes for teacher license. The University of Iceland offers on-campus programmes and the other universities offer teachers certification through a distance educational programmes. All the universities offer 5 credit courses in ICT. The students learn how to use common computer programs, educational programs. They learn how to make a website, to use tools for production of pictures, search for information on the Internet and evaluate information.

How initial teacher training is carried out

The three universities mentioned before have similar systems and teaching methods. ICT-related courses have their own websites where students get information about the course, instructions from the teacher, electronic lectures and verbal- presentations.
The norm for the distance educational programme for primary school teacher students at the Iceland University of Education is few days on campus in the beginning of each semester (August and January) and then the rest of the time teaching and learning via the Internet. A web course is set up either through closed course-ware like WebCT or open websites. Sometimes the same site is used for both distance and on campus students. The system is similar in the other universities, but videoconferences is used to send out their lectures.
In the general course descriptions one usually finds comments about which learning tasks distance students are supposed to perform on the web. This would most commonly be discussion about the learning material and publishing of the result of their studies becomes more and more common. This is most often in form of text documents or Power Point presentations. Teachers would also publish their lectures on the web in various forms, word

documents and Power Point presentations being most common and some experiments with Power Point with sound. The distance students are in many courses asked to write a log book to map their learning process and enhance their meta-cognition as students. A few teachers have experiment with using open blog-sites (web-log) on the web for that purpose. This can also be looked upon as enhancing the feeling of being part of a learning community as you can follow your fellow students´ learning logs (Jóhannsdóttir, 2003).

In-service teacher training: objectives, subject areas and bodies

IN-SERVICE TRAINING FOR PRE-PRIMARY SCHOOL TEACHERS

Since January 1998 the Iceland University of Education has provide in-service training and further education for pre-primary school teachers. In-service training for pre-primary school teachers is also provided by the University of Akureyri. In-service training is not compulsory for pre-primary school teachers. All pre-primary school teachers and pre-primary school head teachers who are employed can apply to be enrolled in an in-service course.

In recent years in-service training courses for pre-primary school teachers have included courses on ethics and education, options and choices in education, counselling and support for parents, administration, educational development, gender studies, guidance, behaviourism, music, ecology, and games and activities. Courses of this kind are usually from 12 to 30 hours of instruction.

Teachers who attend short courses receive a certificate that confirms their participation. As a rule, 80% attendance is required.

IN-SERVICE TRAINING FOR COMPULSORY SCHOOL TEACHERS

The Iceland University of Education provides in-service training and further education for teachers at the compulsory level. The University of Akureyri also offers in-service training courses. Teachers to go abroad, in particular to Scandinavia, Britain or the United States for further education.

The law under which schools at the compulsory level operate allows teachers and heads of schools to apply to the municipalities for leave of absence to improve their knowledge and skills. Instead of taking a full leave of absence the teacher can choose instead reduced number of hours of teaching.

All teachers and head teachers who are employed can apply to be enrolled in in-service courses.

In-service training for teachers has remained optional in Iceland. The Department of Continuing Education of Iceland University of Education is in charge of in-service training at the institution. Every year in February, a catalogue of those courses which are to be offered is sent to all the compulsory schools in the country. Each year between 800 to 1,000 out of a total of 3,500 teachers working in compulsory schools attend the courses which the department offers. Efforts are made to have the courses varied; some run for one or two days, others for a few weeks. Some of the courses are offered in part as distance educational courses.

Courses that have been offered include the teaching of very young learners, teaching techniques, information technology, computer networking, the writing of educational materials, the writing of exams, assessment, diction, drama and role-play, special education, teaching methods at different levels of the school system, gender and education, integration, education for immigrants, team teaching in small schools, school development projects, ecological studies, nature study field trips, ethics, field studies, reading and literacy, dancing and human rights studies.

Some courses are held in co-operation with teachers organisations or their professional associations.
Teachers who attend short courses receive a certificate that confirms their participation. As a rule, 80% attendance is required.

IN-SERVICE TRAINING FOR UPPER SECONDARY SCHOOL TEACHERS
The In-Service Training Institute of the University of Iceland plays a leading role in the in-service training of teachers at the upper secondary level in co-operation with the teachers´ unions. In-service courses for the upper secondary level are mainly initiated by the unions and associations of teachers of particular subjects.
All teachers and head teachers who are employed at the upper secondary school level can apply to be enrolled in in-service courses. In recent years four main options of in-service training have been available to upper secondary school teachers: a) subject based courses, b) training projects that are jointly offered by the In-Service Training Institute of the University of Iceland and its counterpart at Iceland University of Education, c) field studies.

In-service teacher training: curricular framework of ICT for education

In-service training for teachers is optional in Iceland but the compulsory schools are obligated to practice in-service opportunity for their teachers to enhance their professional development. Local authorities are required to finance in-service training for teachers in their school district.
The three universities offer diverse courses in ICT for teachers consistent with the national curriculum. The Iceland University of Education and the University of Akureyri offer courses for teachers in pre-primary and primary and lower secondary schools and the University of Iceland offer courses for upper secondary school teachers. Nine educational centres around Iceland in cooperation with the universities provide varied ICT courses for teachers.
The Iceland University of Education offer about 10 courses (30 credits) within the programme which focus on ICT in the department of graduate studies in distance education. The distance education graduate level program in ICT in education aims at helping people to develop their leadership abilities in this area within the Icelandic educational system. Courses include Information & Communication Technology (ICT) in Education and School Computer Culture; Innovation - Planning for development and research; Reading circle. The students are exposed to a mix of theory and research, design and development, grounded in reflective practice. The students also experience the use of different software tools and technology, facilitating communications and learning using computer. The program is a distance education program where all kinds of software and tools are utilized to facilitate collaboration and online communications within the group(s) and help create a sense of community (professional and learning community). Almost all students in the program are also practicing teachers, some full time with a 50% study load in most cases. The study is organized as project-based in most of the courses where students can and usually do link with their own teaching. The program uses blended technologies, i.e. it is mostly online but with campus-based sessions. It is a model that is also used in all other programs within the graduate department at the Iceland University of Education (Jakobsdóttir, 2004).
The Department of Continuing Education of Iceland University of Education provides varied courses in ICT. On-campus courses are usually from 12 to 30 hours of instruction. The distance educational courses are 6 to 12 weeks of instruction. Five ICT courses are offered on-campus for pre-primary school teachers in winter 2004. They are:

How to use Microsoft Outlook to communicate with the parents.
How to enable your work with common computer programs.
Educational computer programs for young children in the nursery.
The Internet and educational websites for young children.
Teach young children to make multimedia tasks with Power Point.

Three ICT-related courses are offered on-campus for primary and lower secondary school teacher's. They are:

Basics in computer and communication
Computers in the classroom
Computers in education.

Three courses are distance educational courses:

How to make educational websites
Common computer programs
How to use ICT in language instruction.

In addition numerous and varied courses are offered in distance educational programs. Schools order varied courses to be held in their districts. The Department of Continuing Education of Iceland University of Education organizes such project for the school districts.

How in-service teacher training is carried out

As mentioned before the on-campus in-service courses are usually from 12 to 30 hours of instruction. The distance educational courses are 6 to 12 weeks of instruction. The teaching strategies are varied. They are: task-oriented, lectures and collaboration between participants. Some of the courses are offered in part as distance learning courses. The distance learning courses in ICT are mostly in closed course-ware like WebCT – which is becoming the most common web-learning environment in Iceland. The participant can find learning instructions there, what to read and when to deliver their assignments. They can download educational material, print them or read them on-line. They can communicate and collaborate with other participants by using e-mail, participate in discussion forums and chat in real time.

Teachers actual competencies and tasks in using ICT

It is important to emphasize information concerning ICT in Icelandic households as well as individual use of computers and the Internet recorded by the Statistical bureau in Iceland (2004). The use of a computer and the Internet is widespread in Iceland 2004. The participants in the study were 2,000 people between 16-74 years. The 85% of all the individuals used a computer and four out of every five were Internet users.

Few studies have been carried out in ICT- related activities with pre-primary and compulsory teachers in Iceland. In 1999 the Icelandic centre for Research (http://rannis.is) initiated a six-year research programme in Information Technology that included several categories of projects related to the use of IT in the education system in general and to distance learning in particular. Some staff members and students of the IUE participated in or led some of the early projects supported by the Council.

In 2001 a group of staff and students from the IUE obtained a seed grant from the Council to prepare an application for a project that would address issues of teaching and learning through the use of Information and Communication Technology (ICT). A full proposal for the three-year LearnICT project was submitted to the Council in April 2002, and funding for the first year was granted in June 2002.

The purpose of the project is to consider the opportunities presented when ICT is used as a medium in teaching and learning. To achieve this purpose there is a need to understand

what learning supported by technology involves and how it might contribute to the knowledge base on learning. The research is still undergoing in 2004 (NámUST, 2002).

In the year 2002 Lemke a Project Manager (2003) at the Iceland University of Education carried out a research of teacher's competencies in using ICT in certain school district near Reykjavík. The participants were 1,350 compulsory school teachers. The compulsory teachers were asked about their computer skills and the conclusion was that 75% compulsory school teachers use common computer programs, 60% use personal operating systems, 75% use word-processing, 50% use graphics, 60% use search information on the Internet, 65% use e-mail, 65% use the Internet, 40% use spreadsheet, 30% use databases and 40% use multimedia. These results show that teachers in Iceland are using common computer programs frequently.

Since 1998 a study on student computer use has been running and some results have been published. The researcher is Dr. Jakobsdóttir (2003) Associate Professor at the Iceland University of Education. She has carried out two studies on student computer use in Iceland (grades 5 to 10), one from 1998 involving 761 students and the other from 2002 (with 1,403 students). Part of the result was that the students in 2002 reported more of computer-related skills and more confidence than students in 1998. 40% of the schools in 2002 reported that there was an ICT committee where no school participating in 1998 had such a committee. Only 2 out of 13 schools in 2002 reported very traditional teaching method and 11 reported more progressive methods. Also, teacher collaboration appeared to be increasing. Computer related skills have enhanced over the five year period and some progression in teaching methods.

Another study carried out in 2003 shows slow changes in this area in schools. In the study 200 teachers were interviewed and/or observed on ICT use in primary schools. Teachers were asked about the use of ICT in teaching and learning in different school subjects and observed in classrooms where ICT was being used as a tool in learning and/or teaching (Jóhannsdóttir and Gudmundsdóttir, 2004).

The main conclusion in the 2003 study was that in many cases ICT is used to enhance collaboration among students. Access to the Internet is used for information searches and the computer for information processing. In some cases new kinds of collaboration between students is emerging and collaboration of teachers seems to be a good way to organize learning with ICT. When it comes to development of collaboration projects outside the schools we do not in this study have any example of that, but some years ago projects built on communication between children all around the world were quite common e.g. the Kid-link project. We have one example in the study where the emphasis is entirely on creative products. This is a music teacher using a computer program to teach pupils to compose their own music. In the other cases the use of creative programs or the use of computer programs for creative purposes seems to be under-utilized (Jóhannsdóttir and Gudmundsdóttir, 2004).

References

Jakobsdóttir S. and Hjartarson T. (2003), Information and Communications Technology (ICT). Use among Icelandic Students: Moving into the New Millennium, *World Conference on Educational Multimedia, Hypermedia and Telecommunications (EDMEDIA)* (ritstj. David Lassner og Carmel NcNaught Carmel NcNaught), P. 2841-2844, Honolulu, AACE.

Statistical Series (2004), *Information technology*, retrieved 1st July 2004. http://hagstofa.is.

Jóhannsdóttir J. and Gudmundsdóttir K.H. (2004*), Looking into primary school classrooms where information and communication technology is being used*, retrieved 22nd June 2004. http://ust.khi.is/tjona/nera paper04_tj.doc

Jóhannsdóttir J. (2003), *ICT competencies in teacher education - meeting new challenges in the (Arctic) Icelandic society*, retrieved 1st July 2004. http://namust.khi.is/nera_papertj.doc

Macdonald M.A. (2002), *NámUST*, retrieved 1st July 2004. http://namust.khi.is/LearnICT.doc.

Problems that teachers face in using ICT in their practice

The results from the 2003 study show that teachers complain of limited access to the computer-classroom – *It is in use all the time*. They report that too few computers are in the classroom, the computers are too old or they are too often broken. There is a lack of educational software and learning materials at schools. In some schools the school-network is not working. In some places in the countryside the Internet-connection is too slow. Therefore the teachers don't let the students search for information on the Internet in the classroom. The teachers declare they have little knowledge of the pedagogical use of computers and adequate teacher training focusing on the pedagogical use of ICT for education is still far from being realised.

INFORMATION SHEET OF ICELAND

INITIAL TEACHER TRAINING SYSTEM

Typology of teacher	Educational level	Model of teacher training	Duration	National standard
Pre-primary	Pre-primary (1-6)	Trained by universities which graduate students with a B.Ed. degree.	3 years (90 credits) or 4 years at distance	☒ Yes ☐ No
Primary	Compulsory schools: primary and lower secondary level (6-16)	Trained by universities which lead to a B.Ed. degree.	3 years (90 credits) or 4 years at distance	☒ Yes ☐ No
		The University of Iceland also offers a teaching certification programme that qualifies students who have a B.A. or B.Sc. degree to teach at the compulsory level.	3 years plus 1 year	
Secondary	Upper secondary level (16-20)	30 credits programme in pedagogy and didactics, offered by universities, are required in addition to a B.A. or B.Sc. degree or to a diploma in vocational training. Teachers who have completed these programmes are also qualified to teach their specific subject at the lower-secondary level.	3 years plus 15-30 credits	☒ Yes ☐ No
Vocational	Industrial vocational end specialised vocational schools (upper secondary) and lower level	Trained by universities which lead to the diploma in vocational training after B.A. degree.		☒ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

Referring to the Icelandic national curriculum published in 1999, the use of ICT as a learning tool across the curriculum is stressed and IT skills should be considered in that context not as a special subject. Therefore it is expected that the universities in Iceland offer courses in educational technology in teacher training. Each university has its special curriculum independent from the Ministry of Education.

The main subjects of courses in ICT for education are the same for each level of teacher training:

- Have knowledge of the main areas of computer use in schools as well as the possibilities that information technology offers in communication, resource-searching, registration/indexing, processing data, presenting different material, exercising, learning and teaching.
- Be competent users of some specific tools that can be used, develop a progressive attitude towards tasks and gain competency in using the technology in different situations in learning and teaching.
- Explore the effects of new technology on culture and society, education and children's conditions for growing up. Learn to know theories on learning and teaching with ICT and form their own ideas about the organization of schools, learning and teaching with ICT.

Within the 30 credits program for teacher license, all the universities offer 5 credit courses in ICT in distance education.

Focus of training pertaining to ICT for education

- ☐ use of applications (personnel utilities)
- ☒ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☒ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

In-service training is not compulsory and is provided mainly by universities. Some courses are held in co-operation with teachers' organisations or their professional associations. All teachers and head teachers who are employed can apply to be enrolled in an in-service course.

In the compulsory schools it is common for teachers to go abroad, in particular to Scandinavia, Britain or the United States for further education. Moreover each year between 800 to 1,000 out of a total of 3,500 teachers working in compulsory schools attend the courses which the universities offer.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

The three universities offer diverse courses in ICT for in-service training for teachers consistent with the national curriculum. Universities and nine educational centres in cooperation with the universities provide varied ICT courses.

The Iceland University of Education offer about 10 courses (30 credits) within the program which focus on this area in the department of graduate studies in "distance education". This is a distance education program where all kinds of software and tools are utilized to facilitate collaboration and online communications within the group(s) and help create a sense of community (professional and learning community). Almost all students in the program are also practicing teachers (even full time; they have a 50% study load in most cases). The study is organized as project-based in most of the courses where students can do link with their own teaching. The program uses blended technologies, i.e. it is mostly online but with campus-based sessions.

The Department of Continuing Education of Iceland University of Education provides varied courses in ICT. On-campus courses are usually from 12 to 30 hours of instruction. The distance educational courses are 6 to 12 weeks of instruction. Schools order varied courses to be held in their school districts.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☐ digital literacy
- ☐ specific subject
- ☒ use in classroom
- ☒ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

In broad terms teachers in Ireland can be divided into two categories, primary school teachers and post-primary teachers. The regulations for recognition as primary school teachers require a B.Ed degree, or its equivalent of a minimum of three years' duration. A satisfactory probation period equivalent to a minimum of one year is also required. The regulations for post-primary teachers operate on a dual model – either an acceptable university degree followed by a sequential course in teacher education of a minimum of one year's duration, or a concurrent degree involving educational studies and academic subjects for a minimum of four years' duration. While one year's probation is also required for post-primary teachers, the implementation process for this is much looser than that for primary teachers.

DECISION-MAKING BODIES IN INITIAL TRAINING

Traditionally, the universities have exercised academic autonomy on the nature of the teacher education courses provided for secondary teachers. However, the courses do need to incorporate certain stipulations of the Secondary Teachers' Registration Council. As well as specifying certain requirements regarding the degree aspect, the Education dimension of the programmes has to incorporate three major areas: Studies in the Foundations of Education, e.g. Psychology, Sociology; Professional Studies in general and specific methodology aimed for the 12-18 year old age group; Practical Teaching Experience in a recognised second-level school.

Prior to primary teacher education coming under the validation of the universities in 1974, the state Department of Education stipulated the nature of the courses and teaching practice in the Colleges of Education. Since then the universities in conjunction with the colleges have undertaken these responsibilities.

Conor Galvin
University College Dublin

Galvin is an academic researcher based at University College Dublin, Ireland. He has extensive experience in education policy; education ICT; school-based curriculum action; continuity & change in education; and teachers' knowledge. His research interests include understanding how Information and Communication Technologies (ICT) can support research activity and in relation to teachers' / student teachers' professional preparation and development.

INSTITUTES RESPONSIBLE FOR INITIAL TRAINING

Teachers for second level schools are educated and trained in thirteen separate institutions. More than eighty per cent of students follow the consecutive course model in five universities. Certificate Examination are converted to points and competition for places in four of the Colleges is treated as a single contest. The exception is the Church of Ireland Training College, which admits only members of the Church. A similar but separate competition is held for this College. Irish, English and Mathematics are compulsory subjects and three other subjects must be included for the computing of the points. Proficiency in Oral Irish in the Leaving Certificate Examination is also required. The academic status of candidates, as measured by Leaving Certificate performance remains high from year to year and competition for places is very keen. The Department of Education and Science controls the number of entrants to Colleges of Education.

ADMISSION REQUIREMENTS

Since 1992 application for entry to the Colleges of Education to train as primary teachers has been made through the Central Applications Office (CAO) for entry to third level

education. Grades obtained in the Leaving Certificate Examination are converted to points and competition for places in four of the Colleges is treated as a single contest. The exception is the Church of Ireland Training College, which admits only members of the Church. A similar but separate competition is held for this College. Irish, English and Mathematics are compulsory subjects and three other subjects must be included for the computing of the points. Proficiency in Oral Irish in the Leaving Certificate Examination is also required. The academic status of candidates, as measured by Leaving Certificate performance remains high from year to year and competition for places is very keen. The Department of Education and Science controls the number of entrants to Colleges of Education. Due to a shortage of trained teachers the Minister for Education and Science has increased the number of places in recent years. Places for a small number of "mature" students (20 maximum) have been reserved each year since 1972 in the competition for entry to the Colleges: in addition, since 1961 about 10% of places are reserved for qualified students from the *Gaeltacht* (Irish speaking districts) in an effort to maintain the impact of native speakers of Irish on the primary teaching profession.

Linked to the shortage of trained primary teachers, the Minister for Education and Science has also expanded another route into the primary teaching career. University graduates can be admitted to specially designed courses of eighteen months duration to qualify as primary teachers. Admission requirements and arrangements for second level teacher education varies in relation to whether it is a consecutive or concurrent course, and to the nature of the teacher qualification required.

PRIMARY INITIAL TEACHER EDUCATION

The duration of the B.Ed. degree course for primary teachers is three years, and students in the Colleges associated with Dublin City University and the University of Limerick may be awarded an Honours Degree at the end of this time. Students in the Colleges associated with Trinity College Dublin may only obtain an Honours Degree if they complete a fourth year. Those who wish to obtain the Honours Degree usually do the fourth year on a part-time basis when they are already in teaching posts. The Report of the Working Group on Primary Teacher Education, published in 2002, has recommended the extension of the B.Ed. degree course from three to four years but, in the context of current shortages of qualified teachers in the primary sector, this may not come to pass in the immediate term. The course undertaken by university graduates is of eighteen months duration, but the Working Group recommends that this be extended to two years. Within the curriculum for the B.Ed. the study of Education holds a prominent place in all college programmes. Generally speaking the subject is presented under three broad headings:

- Theory: including Psychology, Philosophy, Sociology and History.
- Methodology: including teaching in the curriculum areas, in order to impart curriculum content and specific subject methodologies incorporating preparation, presentation, evaluation, class management, resource management.
- Practical Experience: through micro teaching and teaching under the supervision and guidance of college staff is given in all three years of the course. Practices vary somewhat between the colleges, but typically a student would spend two periods of two or three weeks duration in each of the first two years and a further block period of some four weeks in third year at teaching practice. The students' performance during these periods is carefully monitored and assessed by college staff. This internal assessment is subject to moderation in the last year by the associated University and the Department of Education and Science. Generally, students are required to attain an Honours rating in Teaching Practice (A or B on a 5 Point scale) if they are to receive an honours degree. Applications of ICT have recently become a more

prominent feature of courses. In the larger colleges students also take two academic subjects in first year and one in the subsequent two years. The choice of academic subjects varies between colleges. Among those available in the larger colleges are Irish, English, Mathematics, History, Geography, Music, French and Philosophy. Students who are not pursuing academic courses in Irish and English are generally required to complete professional courses in these subjects.

The fourth year course for honours students of the Colleges linked with University of Dublin (Trinity College) comprises either one academic elective and two education electives or four education electives, from the following range:

- Academic Electives: Irish, English, Religious Education and Development Education.
- Education Electives.

The above course structure which has operated, in the main, since the introduction of the B.Ed. degree in 1974 is likely to be subject to re-structuring and modernisation in the light of the 2002 Working Group Report. Within a four-year framework for all colleges, the colleges are invited by the Working Group to redesign the entire course content, with the fourth year devoted solely to Education Studies. The Report urges a reduction in the time spent at formal lectures in favour of smaller group work and personal study. In particular, the Report Italy urges significant attention to the requirements of the revised primary-school curriculum, introduced in 1999, and now going through a process of implementation: Comparative Education, Educational Administration, Educational Technology, Educational Psychology (including Remedial Education).

POST-PRIMARY INITIAL TEACHER EDUCATION

The consecutive model is the longest established and the most common form of teacher education for post-primary teachers. Graduates from a variety of undergraduate degree courses such as B.A., B.Sc., B.Comm., which they have undertaken over a three or four year period, undertake a one-year full-time course, the Higher Diploma in Education, which specialises in Educational Studies. As was the case with the B.Ed. degree, Educational Studies is divided into three components – theoretical inputs from the foundation disciplines, methodology and didactic studies, and practical teaching experience. This is in line with the requirements of the Secondary Teachers' Registration Council. The foundation studies such as psychology and sociology have a strongly applied emphasis. Methodological components include general methodology and classroom management as well as specific methodologies focussed on two curricular subjects. Extensive use is made of microteaching and analysis of video recorded practice. The application of ICT to teaching and learning is also promoted.

The concurrent model, which is mainly taken by students with subjects of an applied character such as Home Economics, Art, Woodwork, P.E., operates within a four-year course framework. The study of the academic subjects proceeds contemporaneously with Education Studies. As is the case with the B.Ed. degree and the Higher Diploma in Education, Educational Studies incorporate the tripartite elements of studies in the foundation areas of education, methodological or professional studies and the supervised practice of teaching. The four-year time frame allows more time for Educational Studies in the concurrent model, than in the consecutive model.

Initial teacher training: curricular framework of ICT for education

THE CONTEXT OF THE ICT PROGRAMME

In Ireland, the content of the teacher education programmes is not determined centrally.

Instead, each of the recognised teacher education colleges and Universities can design their own programme. ICT training for teachers has been included in the programme in almost all teacher education programmes, since the launch of a national ICT strategy in 1998. Prior to that, coverage was more varied, with a few institutions offering courses, often on an optional basis. In parallel with these developments, there has been a massive programme on ICT training for in-career teachers since 1998. Estimates suggest that more than 70% of teachers have attended at least one of these courses, and many have attended multiple courses.

- *How long (in years) has this training been in operation?*

It varies from institution to institution, but most incorporated ICT by 1999.

- *What percentage of students have been trained?*

In some institutions, ICT is a compulsory component of ITE. In others, it remains an option taken by students. Accurate data is not available on the numbers taking optional courses.

In my own University, all students do a compulsory course, and also have the option of taking a further, more advanced course. Roughly 40% of the cohort choose this optional course.

- *What is the duration of the ICT training programme?*

Varies from institution to institution. In my own University, the course runs for 1 academic year, coinciding with the postgraduate teacher education programme. Programmes are usually evaluated as part of the teacher education programme. Evaluation methods vary, and include practical ICT tasks, production of a portfolio of ICT related materials, evidence of use of ICT in the classroom, and theoretical examinations exploring student understanding of the potential of ICT in education. I am not aware of any attempt to measure commitment of students to use ICT in the classroom, or return on investment.

THE AIMS/PURPOSES OF THE ICT PROGRAMME

- *Are programme aims explicit?* Yes.
- *Is pedagogical change mentioned?* Yes, although care is taken to present some scenarios close to the current reality of schools, so that students teachers can see some immediate uses for the technology.
- *Is school organisational change mentioned?* Yes.
- *Is curriculum change mentioned?* Yes
- *Is the role of the teacher mentioned?* Yes
- *Does the course aim to go beyond technical mastery?* Yes
- *Does the course promote the idea of a community of practice among teachers?* Yes, but to a relatively limited extent.
- *Is the programme embedded in a wider socio-cultural environment?* To some extent.

THE CONTENT OF THE ICT PROGRAMME

- *Does the programme deal with pedagogical paradigms?* Yes
- *Does the programme deal with role of teacher?* Yes
- *Does the programme deal with collaborative learning?* Yes
- *Does the programme deal with the concept of a community of practice?* Yes
- *Does the programme deal with curriculum change / innovation?* Yes
- *Does the programme deal with motivating pupils?* Yes
- *Does the programme deal with differentiation?* Yes, although the term used here is often mixed ability teaching.
- *Does the programme deal with the special needs of learners?* Yes
- *Does the programme deal with the wider socio-cultural environment?* Yes.

THE PEDAGOGY OF THE ICT PROGRAMME

- *Is the pedagogical stance explicit?* Yes
- *Is a constructivist stance evident?* Yes
- *Is a collaborative stance evident?* Yes
- *Is differentiation employed?* Yes
- *Is cognitive mastery encouraged?* Yes

ASSESSMENT OF THE ICT PROGRAMME

Students complete ICT projects at intervals throughout the year. These are assessed as submitted. In addition students answer theoretical questions about the role of ICT in education in terminal examinations. Students taking the optional higher level course produce a portfolio of ICT resources, usually websites and multimedia presentations, designed to model the kinds of tasks they could encourage students to take as projects.

- *Who carries out the assessment?* Academic staff within the University.
- *How frequently is the assessment carried out? At what points in the programme?*

At 2-week intervals throughout the programme, and in a terminal examination.

- *Is a constructivist approach employed?*

To some extent, although this is constrained by timetabling and numbers.

- *Does the assessment require cognitive mastery?*

The assessment is designed to measure the level of cognitive mastery.

How initial teacher training is carried out

Most teacher education is delivered using traditional face-to-face methods. Increasingly, the Universities are using virtual learning environments to provide support material. However these are generally intended as supports to existing teaching, rather than replacing it. In these support materials, there is generally more emphasis on resources than on discussion boards.

Within teacher education programmes, the structures require that students be assessed individually. However, within these constraints, most Universities encourage collaborative work on some projects, in lesson planning and preparation, and in analysis of teaching.

In the last year, an online education provider (Hibernia College) has begun to offer a postgraduate qualification in primary teaching online. This is supported by weekend tutorials in centres throughout the country. At the time of writing, there are no graduates from this course.

In-service teacher training: objectives, subject areas and bodies

The mid nineties can be regarded as a landmark in the historical development of INSET in terms of acceptance by national government of its importance, the putting in place of a Unit to co-ordinate and promote it and the increased investment devoted to it. The former Teacher Centres were now designated as Education Centres. Significant capital investment improved and expanded regional centres. There are now thirty-one Centres, 21 full-time and 10 part-time, each with a Director and Management Board. Their role has expanded and the ICDU promotes a great deal of its INSET work through the Centres. The Centres also maintain their traditional role of responding to the needs of the educational partners at local level. In the context of great changes affecting the education system throughout the nineties, including curricular, assessment, methodological, management and administration, integration of pupils with disabilities or those experiencing grave socio-economic disadvantage, relationships with parents, school development planning, etc. – a great repertoire of INSET programmes – short, medium-term and long-term have become

available from a wide variety of providers. The universities and colleges of education have been providing a great range of INSET certificated courses, mainly on a part-time and fee paying basis. Staff have also been assisting organisations and schools on INSET activities. Some significant long-duration research and development programmes on INSET have been conducted by some universities. Teacher unions, subject associations and management groups have been very active in providing INSET support. A notable development was the launch by the Minister for Education in autumn 1997 of the IT 2000 initiative. This was reflective of a new concern to promote the use of ICT within the school system. The initial investment was £45 million. The National Council for Technology in Education was set up in 1997 to spearhead the drive, in liaison with the Department of Education and Science. Universities, colleges, private companies, Education Centres have all been proactive in providing INSET in ICT to very large numbers of teachers. In a short few years great changes have occurred in the ICT equipment in schools and the improved competence of pupils and learners in the utilisation of ICT for educational purposes. A range of specialist support services, comprised mainly of practising teachers, became operative for many new curricular innovations. At post-primary level support teams were set up for new programmes such as Civic, Social and Political Education, Transition Year Programmes, Leaving Certificate Vocational, Leaving Certificate Applied, Social Personal and Health Education. In 2001 six of the separate support teams were co-ordinated into a single entity – the Second Level Support Service (SLSS) which consists of a Director, six National Co-ordinators and thirty regional Development Officers. The SLSS operates in association with the ICDU. In 1999, a wide-ranging and innovative revised curriculum for primary schools was introduced. An implementation support group – the Primary Curriculum Support Programme – with a complement of eighty-five teachers has been established to assist with the phased implementation of the curriculum.

The Teaching Council Act was passed in 2001. Planning for its implementation is underway. Part of the remit of the Council is the promotion of the professional development of teachers. The Council is required to conduct research into "[...] *the continuing education and professional development of teachers* [...] *and promote awareness among the public and the teaching profession of the benefits of continuing education and training*". The Council will be required to review and accredit in-service courses, and to perform other functions in relation to INSET, as advised by the Minister.

The In-Career Development Unit (ICDU) established within the Department of Education and Science in 1994 is the main co-ordinating and decision-making body regarding state supported in-service provision. The function of the Unit is to determine priorities in the allocation of available state funds for in-career development and the methods of delivery of training. The Unit liaises with the National Council for Curriculum and Assessment, part of whose remit includes advising the Minister on in-career development needs. The Unit co-ordinates the provision of in-service education for primary and post-primary teachers at local and national level and, in doing so, seeks the maximum involvement of teacher and managerial bodies, Education Centres and others, in the delivery of in-career development education. The ICDU has a special relationship with the thirty regional Education Centres. It is through these Centres that most of the work of the ICDU is organised at local level.

The incorporation of ICT in teaching, learning and administration of schools has been a significant government concern over recent years. Significant investment has been made in equipping schools for ICT purposes, and a range of short, medium and long-term INSET courses have been made available to teachers by a variety of providers. A notable INSET programme in ICT was the School Integration Project (SIP), which was organised in 228 and 48 clusters, primary and post-primary, under the aegis of the NCTE.

In-service teacher training: curricular framework of ict for education

THE CONTEXT OF THE ICT PROGRAMME

- *Is the ICT programme centrally determined?*

The National Centre for Technology in Education (NCTE), is a government agency responsible for the development of ICT in schools. NCTE develops and funds a series of in-service short courses for teachers. These are run in centres throughout the country. However, it would be misleading to describe this as centrally determined, as participation in the courses is voluntary for teachers, so each individual teacher can chose the course(s) that he/she feels are of interest.

- *Is ICT training a specific programme? (i.e. not embedded)*

These short ICT courses are not embedded at present. They are offered as a distinct units, typically of 20 contact hours. These are delivered either as 1-week summer courses, or as evening courses during term time (2 hours per week for 10 weeks).

The course currently on offer are:

- Basic Troubleshooting for Teachers;
- Digital Media;
- The Internet & Email for Learning;
- Network Management;
- Website Design & Development for Learning;
- ICT and Special Needs - Autistic Spectrum Disorder;
- Empowering Minds - Programmable Bricks;
- ICT and Special Needs - The Basics ;
- ICT and Special Needs - Learning Support;
- ICT and Special Needs - Mild;
- ICT and Special Needs - Moderate/Severe/Profound;
- ICT and Special Needs - Deaf/Hard of Hearing;
- ICT and the Primary Curriculum;
- Intel Teach to the Future;
- Multimedia Authoring;
- ICT in Mathematics;
- in Guidance;
- Introductory Phase 1 – Primary;
- Introductory Phase 2 – Primary;
- Introductory Phase 1 - Post Primary;
- Introductory Phase 2 - Post Primary.

Some of the courses specify a certain skill level as a pre-requisite for enrolment. There is no fixed progression path through the courses. Much depends on each teacher's individual needs and interests. However, the NCTE actively encourages teachers to progress from the introductory and technical courses to the pedagogically oriented courses.

- *How long (in years) has this training been in operation?* Since 1998 (6 years)
- *What percentage of teachers have been trained?*

Roughly 70% of teachers have taken at least one course. However some of the courses are very basic, and so not all of these teachers should be considered "trained".

- *What is the duration of the ICT training programme?*

20 hour courses, as described above. However many teachers have completed more than one course.

- *What is the target population? (all teachers / specialists?)*

All teachers, although some of the courses are aimed at specialists.

- *Is the programme evaluated? How? What instruments are used?*

The courses have been evaluated by the school inspectors, and some of the courses have been the subject of external evaluation. Teacher achievement in these courses is not assessed – only attendance is recorded.

THE AIMS/PURPOSES OF THE ICT PROGRAMME

- *Are programme aims explicit?* Yes
- *Is pedagogical change mentioned?* Not specifically.
- *Is school organisational change mentioned?* Not specifically.
- *Is curriculum change mentioned?* Not specifically.
- *Is the role of the teacher mentioned?* Not specifically.
- *Does the course aim to go beyond technical mastery?*
  Some courses do, the basic courses do not.
- *Does the course promote the idea of a community of practice among teachers?*
  Some courses do, most do not.
- *Is the programme embedded in a wider socio-cultural environment?* Yes

THE CONTENT OF THE ICT PROGRAMME

- *Does the programme deal with pedagogical paradigms?*
  Some courses, but not the basic skills courses.
- *Does the programme deal with role of teacher?*
  Some courses, but not the basic skills courses.
- *Does the programme deal with collaborative learning?*
  Some courses, but not the basic skills courses.
- *Does the programme deal with the concept of a community of practice?*
  Some courses, but not the basic skills courses.
- *Does the programme deal with curriculum change / innovation?*
  Some courses, but not the basic skills courses.
- *Does the programme deal with motivating pupils?* To some extent
- *Does the programme deal with differentiation?*
  Some courses, but not the basic skills courses.
- *Does the programme deal with the special needs of learners?*
  Some courses, but not the basic skills courses.
- *Does the programme deal with the wider socio-cultural environment?* Yes

THE PEDAGOGY OF THE ICT PROGRAMME

- *Is the pedagogical stance explicit?* Not usually.
- *Is a constructivist stance evident?* Not usually.
- *Is a collaborative stance evident?* Not usually.
- *Is differentiation employed?* Only through self-selection onto courses.
- *Is cognitive mastery encouraged?* Unsure.

How in-service teacher training is carried out

All of the in-service work at present is done through face-to-face courses. Software is used in the courses, and much of it is conduced in computer rooms. But to date there has been little online delivery or support for these courses.

There is at present some discussion of the possibilities of providing online courses, but the timescale for these is not yet clear. The NCTE has established discussion areas for teachers, but at present usage of these is modest.

Teachers actual competencies and tasks in using ICT

ICT development has been monitored through a series of census surveys (i.e. surveys of all schools). These were conducted in 1998, 2000, and 2002. Each survey asked schools to rate the level of computer skill of their teachers.

In 1998 many teachers had little ICT experience. A quarter of primary teachers and 42% of post primary teachers had "*no computer skill*". Since then ICT courses for teachers have been supported in centres throughout the country. The take-up of these courses has been enormous. Since 1998 over 85,000 course places have been provided for teachers. As this far exceeds the number of teachers, it is clear that many returned for second and third courses. The estimates in the 2000 census suggest that 70% of the teachers in the country attended at least one ICT course.

As a result of these courses and the increased use of ICT in general, over 80% of teachers had "*some ICT skill*" by 2002. The majority were also familiar with the Internet and most had a computer at home. The majority of teachers in primary and special schools made some use of ICT in their teaching. However, despite their ICT skills, only a quarter of teachers in post primary schools made use of ICT in their teaching. A series of factors may explain this difference. Firstly the specialisation of teachers in specific subjects in post primary schools may encourage schools to designate a number of computer teachers, whereas in primary and special schools teachers are expected to deal with all parts of the curriculum. Secondly, the pressures of examinations in post primary schools may discourage any use of ICT, as suggested by the access patterns reported earlier. Thirdly, the basic structure of the school day with relatively short periods may make it more difficult to make creative use of ICT. Computer skill and home access to computers were higher for primary teachers than for post-primary teachers. This seems to suggest that use for work is part of the reason why they have a home computer (otherwise one would expect no difference in home access, as primary and post-primary teachers have similar pay, backgrounds, etc.).

TEACHER ICT SKILL 2002

	Primary	Post-primary	Special school
Teachers with some computer skills (e.g. would be able to produce a document using a word-processor, or run CD ROM software)	90.9	77.6	88.3
Teachers with some email and Internet skills (e.g. would be able to send and email or browse the web)	81.8	69.5	80.8
Teachers with computer at home	72.3	57.7	66.8
Teachers with Internet access at home	62.3	52.2	62.5
Teachers who use computers in lesson preparation	43.2	39.4	57.1
Teachers who use computers in their teachings	60.2	27.8	76.6

Problems that teachers face in using ICT in their practice

In the 2002 survey, schools were asked to rate a series of difficulties to further use of ICT. The table below show the main items in rank order. It is clear that infrastructure and technical support remain serious difficulties. However, there is also strong reason to belief that even if these were provided, curricular issues would provide a barrier, especially at post-primary (secondary) level.

At present ICT is not a discrete subject in the Irish curriculum. In many schools ICT has been treated as a subject, and assessed using certification such as the ECDL. Much of the use of ICT in schools remains focused on teaching basic skills, and relatively little involves real integration.

WHAT SCHOOLS NEED NOW

% of schools giving this a high or very high priority	Primary	Post-primary	Special school
More computers distributed around classrooms	69.9	85.8	64.8
More computers in a central computer rooms	42.7	56.5	16.0
More tecnical support and help with maintenance	90.6	92.1	85.9
Replacement/renewal of older equipment	78.3	90.5	82.2
Independent advice on purchase/licences	63.0	64.1	66.7
Faster Internet access	83.2	93.0	86.8
Internet access on more computers	58.9	75.8	48.8
Development of a school network	47.1	65.8	33.7
More training for teachers	86.4	68.6	90.0

INFORMATION SHEET OF IRELAND

INITIAL TEACHER TRAINING SYSTEM

Typology of teacher	Educational level	Model of teacher training	Duration	National standard
Pre-primary				☐ Yes ☒ No
Primary	First level education/primary (4-12)	It's required a B.Ed degree, or its equivalent, released by the Colleges of Education. Those who wish to obtain the Honours Degree usually do the fourth year on a part-time basis when they are already in teaching posts. University graduates can be admitted to specially designed courses of eighteen months duration to qualify as primary teachers.	Minimum 3 years + 1 year of probation period	☒ Yes ☐ No
Secondary	Second level education: junior cycle + senior cycle (12-18)	*Dual model*: either an university degree followed by a *sequential* course in teacher education (Higher Diploma in Education), or a *concurrent* degree involving educational studies and academic subjects for a minimum of four years' duration. More than eighty per cent of students follow the consecutive course model in five universities. The concurrent model is mainly taken by students with subjects of an applied character.	Minimum 4 years + 1 year of probation period	☒ Yes ☐ No
Vocational				☒ Yes ☐ No

Content areas involved in teachers' competencies profile in ICT for education

Content Area 1: Familiarity with the technology. A vision/understanding of how ICT can be of value in education, knowledge and experience of classroom practices and pedagogies that can be used in conjunction with ICT in the classroom.

Existence of teacher training courses based on ICT?	☒ Yes	☐ No

ICT IN INITIAL TEACHER TRAINING

Content

ICT training for teachers has been included in the programme in almost all teacher education programmes, since the launch of a national ICT strategy in 1998. Prior to that, coverage was more varied, with a few institutions offering courses, often on an optional basis.

Today, in some institutions ICT is a compulsory component of initial training. In others, it remains an option.

Students complete ICT projects at intervals throughout the year. These are assessed as submitted. Students taking the optional higher level course produce a portfolio of ICT resources, usually websites and multimedia presentations.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☐ digital literacy
- ☐ specific subject
- ☒ use in classroom
- ☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

In the context of great changes affecting the education system throughout the nineties, a great repertoire of INSET (in-service training) programmes have become available from a wide variety of providers. The universities and colleges of education have been providing a great range of inset certificated courses (accredited by the Council), mainly on a part-time and fee paying basis. Teacher unions, subject associations and management groups have been very active in providing INSET support.

Existence of teacher training courses based on ICT?	☒ Yes	☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

Since 1998, there has been a massive programme on ICT training for in-career teachers. More than 70% of teachers have attended at least one of ICT short courses, and many have attended multiple courses. These courses are offered as distinct units, typically of 20 contact hours. Teachers are encouraged to progress from the introductory and technical courses to the pedagogically oriented courses.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☐ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

In the Italian school system, there are two types of teacher: a) Nursery and Primary School Teachers and b) Secondary School teachers. They differ in qualification (*laurea* for nursery and primary teachers and *scuola di specializzazione* for seconday teachers) and in initial training, which shares objectives and content areas but differs in the ways it is implemented.

In the following, the main objectives of the *laurea* and *scuola di specializzazione* (SSIS) courses and qualifying minimum contents are described as stated by the Ministerial Decree of 26 May, 1998.

OBJECTIVES

1. To have adequate knowledge of one's subject areas with reference to historical and epistemological aspects.
2. To listen, observe, understand students during their formative activities, becoming aware also collectively of their formative and psycho-social requirements in order to promote the building up of students' personal identity, together with self-guidance.
3. To work in close collaboration with colleagues, families, school authorities, formative, productive and representative agencies of the area;
4. To set one's subject competencies in the various educational contexts with an open mind towards critics and cultural interaction.
5. To keep developing and furthering one's subject knowledge and skills in the various educational contexts.
6. To make teaching activities meaningful, systematic and complex through flexible curricular planning which includes decisions on objectives, knowledge areas, teaching methods.
7. To make students participate in a specific domain of knowledge and experience in accordance with their school progression, specificity of contents, contents-methods interrelation, as well as with other formative areas.
8. To organise time, space, materials (including multimedia materials) and educational technologies to make school a learning place for everybody.
9. To manage communication with students, and the interaction among them, as essential means for building up attitudes, skills, experiences, knowledge, to increase the pleasure of learning and expressing oneself and the confidence to be able to acquire new knowledge.
10. To promote school innovation in various ways, including collaboration with other schools and the labour market.
11. To verify and assess teaching-learning activities and overall school activity, using advanced evaluation techniques.
12. To carry out one's social role in the framework of school autonomy, being conscious of teachers' rights and duties and the related organisational problems, paying attention to the civic and cultural (Italian and European) setting, to multiculturality as well as to the specific problems of teaching students of non Italian culture, language and nationality.

Vittorio Midoro
Istituto Tecnologie Didattiche, CNR

Project manager of uTeacher, Midoro is senior research fellow at Istituto Tecnologie Didattiche (National Research Council, Italy). His present research activity pertains to on line education, co-operative learning and e-learning for lifelong learning.

CONTENT AREAS

The teaching regulations of each university establish the minimum qualifying contents required to achieve these objectives, teaching activities and related formative credits for the following areas and the related scientific subject-related sectors.

Area 1: teacher function training

This includes teaching activities aimed at acquiring the required attitudes and skills in the pedagogical, teaching-methodological, psychological, social-anthropological and hygiene-medical fields, as well as skills related to school integration for disabled students.

Area 2: primary teaching contents

This refers to curricula and teaching orientations of infant and primary school. Furthermore, it includes teaching activities aimed at acquiring attitudes and skills related to subject foundations and operative abilities in the following fields: Languages and Literature; Mathematics and ICT; Physical, Natural and Environmental Sciences; Music and Sound Communication; Psycho-motor Sciences; Modern Languages; historical-geographical-social field; Drawing and other figurative Arts.

Area 3: laboratory, which includes analysis, planning and simulation of teaching activities.

Area 4: apprenticeship, which includes teaching experience carried out in schools to integrate theoretical and operative skills.

INITIAL TRAINING OF NURSERY AND PRIMARY SCHOOL TEACHER

Four-year *laurea* course (*laurea* is a certification of completion of coursework at second level university) is required for Nursery and Primary School Teachers.

The diploma *superamento dell'esame di Stato* is required to enrol in the degree courses *laurea* (including the degree courses in primary education sciences). Admission to degree courses requires to stand for an examination due to the limited number of places planned at national level. The *laurea* is required for admission to the competitive examinations for teaching places in nursery and primary schools. The four-year *laurea* course is subdivided into a common two-year study course and in two branches of study, one for *scuola dell'infanzia* and one for primary school.

Apprenticeship and specific additional teaching activities for the integration of disabled pupils are also foreseen; they can be a title for admission to the examination for places destined to support teaching.

INITIAL TRAINING OF SECONDARY SCHOOL TEACHERS

Two years of post graduate teachers college, called SSIS, for secondary teachers. Courses have a duration of at least two years and lead to a university diploma of the third level. There are 20 SSIS, one for each Region.

To enrol in the specialisation schools (*scuole di specializzazione*) for teaching in secondary schools a degree - university diploma - is required. The number of available places is fixed beforehand. Admittance is decided on the basis of position in the classification list.

Initial teacher training: curricular framework of ICT for education

ICT FOR NURSERY AND PRIMARY SCHOOL TEACHERS

The topic "ICT for education" is not specifically addressed in the university courses for aspirant Nursery and Primary School Teachers.

Although some universities offer courses in educational technology (and that could be considered the start of a new trend), in the initial training of Nursery and Primary School

Teachers, ICT skills, information literacy and educational technology are not explicitly considered a relevant competence pertaining to the professionalism of an aspirant teacher. In the curriculum for aspirant Nursery and Primary School Teachers, ICT are often confined in one informatics course and not regarded as a strategic tool that allow students to learn, communicate, cooperate, produce, save, access and share information, etc. This is due to both the historical gap between the humanist culture and the technical/scientific one, and the lack of technical/scientific competence in the staff of universities offering courses for aspirant Nursery and Primary School Teachers.

ICT FOR SECONDARY SCHOOL TEACHERS

As mentioned above, there are 20 post graduate teachers colleges (SSIS) - post graduate schools - for secondary school teachers. SSIS are managed by universities at regional level. Each SSIS defines its own curriculum. In some SSIS, there is no topic related to ICT for education. In the others, this topic is dealt within one of 5 main approaches:

- one or more *autonomous mandatory courses in educational technology* are offered to all aspirant teachers;
- in the absence of a course in *educational technology and ICT*, educational technologies are embedded in courses related to a given curriculum area (Maths, Language, etc.);
- a course in *information literacy* (producing, storing, communicating sharing information and cooperating);
- a course in *basic computing science* (Informatics);
- courses of *different subjects which are delivered by means of ICT*.

Autonomous mandatory courses in Educational Technology

Objectives and content areas of these courses support a learning-centred school, in contrast with the present school based on teaching. Although behaviouristic approaches are mentioned, the courses are mainly focused on constructivist and social constructivist approaches, which consider learning as a process of assimilation and adaptation in the context of a learning environment. Herein Educational Technology is conceived as the area of study and practice dealing with processes and systems to develop and manage learning environments.

The curricula of such courses involves:

- learning theories supporting school innovation based on ICT (constructivism, social constructivism, cognitive apprenticeship, situated learning, etc.);
- learning models and methods supporting learning processes based on these theories (learning communities, cooperative learning, project based learning, peer learning, etc.);
- learning environments supporting these models and processes (micro worlds, virtual communities, etc.);
- ICT (tools and methods supporting these environments: editors, wordprocessors, hypertext editors, cad systems, CMC systems, graphic editors, music editors, etc.);
- instructional design related to the development and management of learning environments;
- school innovation issues (teacher's new role, organisational issues, etc.).

Educational Technology and ICT embedded in a curriculum area

In this case, there are courses dealing with a specific school curriculum area (Maths, Language, Physics, etc.) and the focus is how ICT can enhance the understanding of this specific area. Educational software specific for this area and conditions for using it in the classroom are described and trialed, applications of productivity tools in the context of the given subject are shown, relevant web sites for such areas are studied.

As far as ICT for the didactics of a given subject is concerned, the curricula of such courses involves:

- educational software for the specific subject (examples include Derive, Cabri Geometre, drill and practice software for Maths; sensors connected to the computers, simulation environments, microworlds for Physics, etc.);
- uses of productivity tools in the context of the discipline (Excel in Maths and Physics, wordprocessors in written language, electronic dictionaries in Language, databases in History);
- relevant web sites for the given subject.

Information Literacy

In this case the focus is on general information skills pertaining to basic concepts, processes, methods, techniques, systems, tools for producing, storing, communicating and sharing information and communication. In these courses, stress is placed on the potential of the network and web for creating communities of practice and virtual learning communities. Particular attention is paid to cooperation methods and Computer Based Cooperative Work (CBCW) strategies.

As far as information literacy is concerned, the curricula of such courses involves:

- Multimedia systems
- Designing multimedia
- Systems for producing and storing multimedia and hypermedia communication
- E-mail systems
- Computer mediated communication systems
- Sharing information on the web.

Basic Computing Science

These courses should be considered an introduction to basic ideas and applications of ICT and are addressed to an ICT novice. Their main aim is to raise awareness about the opportunities ICT offer for individual productivity and learning, and to help students use basic computer programs.

The syllabus of these courses is often a subset of ECDL subjects and the objectives regard skills for using basic functions of both a computer and the Internet. Some of these courses also deal with educational software, describing its nature, the methods and tools for selecting it, conditions for using it in the classroom. Software packages for preparing and delivering presentations (e.g. PowerPoint) or for designing a hypermedia or a web site are often dealt with in these courses to give them an educational flavour.

Courses of different subjects delivered by means of ICT

Many SSIS run courses using ICT at different levels. Some use e-mail to enhance communication between teachers and students. Some use the web to deliver learning material to students. Others still use CMC systems to support learning at a distance and cooperative work among the students. All of these induce implicit learning about how ICT can be used to support learning processes.

How initial teacher training is carried out

Systematic data on methods are not available at national level. However there are SSIS which deliver blended courses on ICT for education.

In these courses lessons in presence are delivered by the lecturer and online lessons are committed to the tutor, who proposes to the students individual and collaborative activities and supports them in the preparation of the exam. The activities are organised in

modules of one or two weeks, staggered with the lessons in presence. In some cases the online and in presence learning actions are closely connected and harmonized, in other cases there is a weak link among F2F lectures and online activities.
Through access to an online environment students can retrieve the learning material, compile evaluation tests and participate in the forum to communicate with their tutor and colleagues and to perform tasks. In some courses the acquired knowledge can also be experimented in laboratories or during the apprenticeship period.

In-service teacher training: objectives, subject areas and bodies

The Ministry of Education defines the main targets at national level, the criteria for the distribution of the financial resources, gives guidelines about the monitoring of the improvement of the educational activities and its results. As for training and up-dating of school staff, the Ministry of Education University and Research, also taking into account the yearly integrative bargaining, issued regulations (directive no. 74 of 27th June 2000) providing for what follows:

- implementation sector, including the whole professional development of school staff and, therefore, both in-service training and induction training;
- priority formative objectives, basically corresponding to the re-definition and enrichment of professional profiles related to the innovation processes of the school system and to the consolidation of autonomy culture;
- the role of the different levels of school administration (schools, *Uffici Scolastici Regionali,* central administration) as for the attainment of the objectives and criteria for the sub-division of the resources among the three administration levels. The funds share destined to school, which should be sub-divided by the *Uffici Scolastici Regionali* according to objective criteria, aims at the requirements established within the plan of the educational offer *Piano dell'Offerta Formativa* (POF). The formative interventions on priority aspects related to methods, didactics, organisation and subjects areas will be mainly focused on strengthening competencies in mathematics as well as scientific, linguistic and information.

The school staff's integrative collective contract of 31st August 1999 has introduced the principle of accreditation of entities or agencies for the training of school personnel and recognition of training activities from the Administration. The contract makes a distinction among entities offering teacher training, among those which are qualified in themselves (Universities, University consortia, IRRE and public institutes for the research), those which have been qualified after having gained the Ministry's recognition (like professional associations related to scientific communities) and those accredited on the basis of fixed criteria (like the goals foreseen by the statute, activities carried out, availability to consent monitoring inspection and evaluation). Also single or associated schools with specific skills and suitable infrastructure can offer teacher training. Measures provided to teachers are basically update activities proposed and managed by the School administration, that is accredited bodies and agencies, on the basis of a close examination carried out by a National Technical Committee (*Comitato Tecnico Nazionale*) and the Ministry of Education, also in collaboration with various Ministry bodies as INDIRE and INVALSI, at national level, and IRRE, universities and research bodies at regional level. It is particularly worth mentioning the national training programme on information and technologies skills of school personnel, published through ministerial circular of 21st May 2002, ref. n. 2416, in accordance with a resolution of the Council of Ministers of 22nd March 2001 which adopted indications of the e-Europe action programme launched at Lisbon in March 2000.

The reimbursement of duly documented self-updating expenses of teachers is another initiative in favour of all teachers. Law n. 448 of 28th December 2001 provided a grant of 35,000,000 euros for year 2002. Refundable initiatives can be grouped as follows:

- training initiatives promoted by accredited bodies;
- university specialisation courses (masters, research scholarships, etc.);
- stages in enterprises;
- book purchase and subscription to specialised magazines;
- educational software purchase;
- subscription to web sites and rentals.

In-service teacher training: curricular framework of ICT for education

In May 2002, in the context of the National Actions for the Information Society (March 2001) [the Italian action in the European Action Plan e-Europe (Lisbon, 2000)] the Italian Ministry for Education (MIUR) launched a wide national plan for in-service teacher training in ICT (http://www.istruzione.it/innovazione/progetti/tic.shtml).
The project is articulated in three initiatives:

a. Basic uses of computer in the classroom and in school organisation (mainly addressed to ICT novices) (160,000 teachers).
b. Uses of ICT for learning, school organisation and consulting (mainly devoted to pioneer teachers) (13,550 teachers).
c. Uses of ICT to develop and manage the school technological infrastructure (mainly devoted to teachers who are in charge of the school infrastructure) (4,500 teachers).

Initiatives A (http://www.istruzione.it/innovazione/progetti/allegati/percorso-a.pdf)
The syllabus related to this part involves 14 modules. 8 modules are a subset of the ECDL syllabus. Module 9 is about "Communication and ICT". Modules 10-14 are a subset of part 2, namely:

- ICT and Learning/Teaching Processes
- Curriculum areas and ICT
- Learning environments and ICT
- Collaborating and learning on-line
- Evaluation and ICT.

Initiatives B (http://www.istruzione.it/innovazione/progetti/allegati/percorso-b.pdf)
The syllabus related to this part involves 10 modules:

- Module 1 – Educational technology in School innovation
- Module 2 – ICT and Learning/Teaching Processes
- Module 3 – Disciplines and ICT
- Module 4 – Learning environments and ICT
- Module 5 – Collaborating and learning on-line
- Module 6 – Evaluation and ICT
- Module 7 – Role of ICT in the integration of disabled students
- Module 8 – School management and ICT
- Module 9 – In-service training and ICT
- Module 10 – On-line education

Appendix A reports the detailed description of these modules.

Initiative C (http://www.istruzione.it/innovazione/progetti/allegati/percorso-c.pdf)
The syllabus related to this part involves 17 modules dealing with advanced computer

science for teachers with high-level competence in computer science and applications. These teachers are those who manage the infrastructural aspects related to ICT within their school.

How in-service teacher training is carried out

Initiatives A, B and C described in previous sections are structured according to a blended model based on a low level of interaction among participants.
Each module lasts 12 hours: 6 hours are F2F and are coordinated by a tutor; 6 hours are online. The virtual environment for the online part supplies learning material from the web (informative material, in-depth analyses, tests, comparative analyses, etc.), that teachers can download and read individually for self-training, and non moderated teacher forum devoted to discussion.

Teachers actual competencies and tasks in using ICT

In Italy, a study realized at national level by the AIE - Italian Publishers Association, in collaboration with the IARD Institute, takes into account the relation between teachers and ICT focusing on changes in teaching brought about by technological innovation.
The results were published in March 2004 (see charts in APPENDIX B) and show that 37% of teachers regularly use a PC to prepare their lessons and 20% use a PC for classroom presentations.
As to the Internet, most teachers use the Web mainly to acquire further knowledge in their subject matter (62%), to visit websites dealing with school and education (26%), to download material for classroom use (20%) as assessment tests, tools for school activity management, lists of subject links, etc., and to access to encyclopaedias and databases (19%). The autonomous use of ICT by students in the classroom is encouraged by teachers who are normally more experienced: 36% invite students to search for information on Internet, 22% ask for printed essays/exercises, 20% suggest websites.
The analysis of this study shows that it is based on a traditional transfer model characterized by a teacher-centred approach. The prevalence of this view is supported by observations that teachers continue to rely on old standbys such as lectures, textbook reading, and fill-in-the-worksheets practices that reduce students to passive recipients of information and fail to develop their thinking skills.
Innovative uses of ICT in education based on learner-centred models exist though they are not investigated in this study. These models provide opportunities for teachers and students to collaborate but so far only leading schools feature these practices.

Problems that teachers face in using ICT in their practice

The results emerged from this study, show that one of the major factors preventing teachers from using computers in the classroom is the lack of PCs and data projectors (67%), the lack of educational software and learning materials at school (55%). As a matter of fact, in Italian schools computers are available mainly in labs (78%).
As to the pedagogical use of computers an adeguate teacher training focusing on the pedagogical use of ICT for education is still far from being realised (45% of teachers declares to have little knowledge of this issue). From this point of view, the main risk is that teachers try to integrate ICT in their practice drawing information from either literature or the Internet and not from ad hoc training processes.

Content areas involved in teachers' competencies profile in ICT for education

The following list reflect the above mentioned modules of the *National Plan for In-service Teacher Training in ICT (Initiative B)*:

- Educational technology in School innovation
- Educational technology and Learning/teaching Processes
- Disciplines and ICT
- Learning environments and ICT
- Collaborating and learning on-line
- Evaluation and ICT
- Role of ICT in the integration of disabled students
- School management and ICT
- In-service training and ICT
- On-line education.

A detailed description is available in Appendix A.

Appendices

APPENDIX A – Detailed description of the modules of the *National Plan for in service teacher training in ICT, Initiative B.*
Available at http://ulearn.itd.ge.cnr.it/uteacher/national_reports.htm (Italian report).

APPENDIX B - Source: Observatory AIE/ IARD institute - Report of 2004.
Available at http://ulearn.itd.ge.cnr.it/uteacher/national_reports.htm (Italian report); http://www.aie.it/Allegati/News/Presentazione IARDosservatorio AIE - 2004.pdf (Italian report).

INFORMATION SHEET OF ITALY

	Typology of teacher	Educational level	Model of teacher training	Duration	National standard
INITIAL TEACHER TRAINING SYSTEM	*Pre-primary*	Nursery school (age 3-5)	University degree for Nursery and Primary School Teachers. Admission to degree courses requires to stand for an examination due to the limited number of places planned at national level. The degree is required for admission to the competitive examinations for teaching places in nursery and primary schools.	4 years	☒ Yes ☐ No
	Primary	Primary school (age 6-10)	see above	see above	☒ Yes ☐ No
	Secondary	Lower secondary school (age 11-13) Upper secondary school (age 14-18)	Two years of post- graduate teachers college, called SSIS, for secondary teachers. There are 20 SSIS, one for each Region.	University degree + 2 year specialisation course (University diploma)	☒ Yes ☐ No
	Vocational	see above	see above	see above	☒ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

NURSERY AND PRIMARY SCHOOL TEACHERS

The topic "ICT for education" is not specifically addressed in the University courses for aspirant Nursery and Primary School Teachers.
In the curriculum for aspirant Nursery and Primary School Teachers, ICT are often confined in one informatics course.

SECONDARY SCHOOL TEACHERS

Each SSIS defines its own curriculum. In some SSIS, there is no topic related to ICT for education. In others, this topic is dealt within one of 5 main approaches:

- one or more autonomous mandatory courses in educational technology are offered to aspirant teachers;
- in absence of a course in educational technology and ICT, educational technologies are embedded in courses related to a given curriculum area (Maths, Language, etc.);
- a course in information literacy (producing, storing, communicating, sharing information and cooperating);
- a course in basic computing science (Informatics);
- courses of different subjects which are delivered by means of ICT.

Focus of training pertaining to ICT for education

☒ use of applications (personnel utilities)
☒ digital literacy
☒ specific subject
☒ use in classroom
☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM	The Ministry of Education defines the main targets at national level, the criteria for the distribution of the financial resources, gives guidelines about the monitoring of the improvement of the educational activities and its results. It is particularly worth it to mention the national training programme in 2001 on information and technologies skills of school personnel, which adopted indications of the e-Europe action programme launched at Lisbon in March 2000.

Existence of teacher training courses based on ICT? ☒ Yes ■ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

In 2002 the Italian Ministry for Education (MIUR) launched a wide national plan for in-service teacher training in ICT. The project is articulated in three initiatives:

a. Basic uses of computer in the classroom and in school organisation (mainly addressed to ICT novices) (160,000 teachers)
b. Uses of ICT for learning, school organisation and consulting (mainly devoted to pioneer teachers) (13,550 teachers)
c. Uses of ICT to develop and manage the school technological infrastructure (mainly devoted to teachers who are in charge of the school infrastructure) (4,500 teachers)

Initiatives A

The syllabus related to this part involves 14 modules. 8 modules are a subset of the ECDL syllabus. Module 9 is about "Communication and ICT". Modules 10-14 are a subset of part 2, namely:

- ICT and Learning/Teaching Processes,
- Curriculum areas and ICT,
- Learning environments and ICT,
- Collaborating and learning on-line,
- Evaluation and ICT.

Initiatives B

The syllabus related to this part involves 10 modules:

- Module 1 – Educational technology in School innovation
- Module 2 – ICT and Learning/Teaching Processes
- Module 3 - Disciplines and ICT
- Module 4 – Learning environments and ICT
- Module 5 – Collaborating and learning on-line
- Module 6 – Evaluation and ICT
- Module 7 – Role of ICT in the integration of disabled students
- Module 8 – School management and ICT
- Module 9 – In-service training and ICT
- Module 10 – On-line education.

Initiative C

The syllabus related to this part involves 17 modules dealing with advanced computer science for teachers with high-level competence in computer science and applications. These teachers are those who manage the infrastructural aspects related to ICT within their school.

Focus of training pertaining to ICT for education

☒ use of applications (personnel utilities)
☒ digital literacy
☒ specific subject
☒ use in classroom
☐ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

In the Norwegian school system, there are three main types of teachers:
a) Nursery/Kindergarten teachers[1]
b) Primary and Lower Secondary School teachers
c) Upper Secondary School teachers.

INITIAL TRAINING OF NURSERY SCHOOL TEACHERS

Nursery school teachers could teach the 1st grade of the lower primary school. To teach in the 1st-4th grade of the primary school, nursery teachers have to take further education for one year (we will not draw any more attention to this type of education in this report).

INITIAL TRAINING OF PRIMARY AND LOWER SECONDARY SCHOOL TEACHERS

In the new framework for primary and lower secondary school teachers there are some curricular subjects who's a compulsory part of the education. The compulsory part is: Pedagogy, Religion, Mathematics, Norwegian (native language), Basic reading, writing and arithmetic skills.

Morten Soby
Norwegian Network for IT - Research and Competence in Education, University of Oslo

Morten Søby is Director for the Norwegian Network for IT-Research and Competence in Education (since 1997). He has been a Consultant for NKS Distance Education (1987-91), Research Fellow at the Institute for Educational Research, University of Oslo (1991-96) and Director of 6th International Conference on Cyberspace (1997). Member of the Nordic Council of Ministers IT-policy group (1999-00).

INITIAL TRAINING OF UPPER SECONDARY SCHOOL TEACHERS

Teachers teaching in upper secondary school normally have a Practical Pedagogical Education (PPE) on top of an academic degree. In their academic degree (bachelor or master) they have one or more subjects of specialisation.

Initial teacher training: curricular framework of ICT for education

ICT FOR PRIMARY AND LOWER SECONDARY SCHOOL TEACHERS

In the latest framework for teacher education by the Ministry of Research and Education (3rd April 2003), the topic "ICT for education" is not specifically addressed as an own discipline. Though, the framework emphasizes the importance of ICT knowledge for teachers: *"ICT should be a interdisciplinary tool for communication and learning". "Teacher students should have competence to use [new] technology in learning and communication, but they should also be able to reflection critical around the use of it".*

Each University College defines its own curriculum. In some University Colleges, the topic is not prioritised, whilst others have had a strong focus on ICT in recent years. Examples of good practice we find in University Colleges involved in the PLUTO-program.

PLUTO (Programme for Teacher Education, Technology and Change) was established in 1999 as a reform programme in teacher education. PLUTO deals with an innovative and comprehensive restructuring of teacher education. The programme is anchored in the Ministry of Education and Research's action plan "*ICT in Norwegian*

1. In Norway the pre-school years (before age 6) is not part of basic education. We will therefore omit this type of education in the further discussion.

Education – Plan for 2000-2003", where the PLUTO projects are integrated as the Ministry's special focus initiative in restructuring teacher education. The main findings in the PLUTO programme was:

For students

- Portfolios as part of new work methods create new learning processes where theory and practice are integrated better than before.
- One outcome of the portfolio method seems to be that the students produce more text, which improves the quality of learning.
- The students who define collaboration with members of their base group as a productive work method assess their experience with PLUTO as highly relevant for their future occupation.
- The assignments the students are exposed to be crucial to ensure that the students' group work meshes with their other studies (e.g. linkage between different subjects).
- "*Less is more*" - creating high quality in learning efforts requires time and in-depth study - e.g. Open Experiments in Science Subjects (Education, Information Assessment and Argumentation Project, Practical Pedagogical Education, UiB).

For teachers

- Changing the organisation of the students' work into sections and with portfolios creates new forms of collegiality. A collective orientation evolves.
- Academic leadership is a precondition for innovation.

Educational Technology and ICT embedded in a curriculum area

ICT competence for a curriculum area are rather vague in the Ministry of Research and Education's new framework for teacher education: i.e. "*to be a teacher in English the student should have experience in using and assessing ICT and other media in their teaching*". Each University College are free to implement ICT in their own chosen way. We come back with examples of how this is done in the following sections.

ICT FOR UPPER SECONDARY SCHOOL TEACHERS

There are 4 Universities in Norway which all offers teacher education for postgraduate students: Practical Pedagogical Education (PPE). The Universities educate teachers for upper secondary school.

In the latest framework for PPE by the Ministry of Research and Education (3rd April 2003), the topic "ICT for education", is not specifically addressed as an own discipline.

As with the University Colleges, each University defines its own curricula, and the focus on ICT in education differs among the institutions.

Norwegian University of Science and Technology (NTNU) writes for their PPE course: "*As a LMS system for the course we use it's: learning. It's a premise that every student starts to use the LMS by their first semester*"[2].

The University of Oslo also has a strong focus on ICT in its teacher training: "*As a student you'll be part of a curricular framework with ICT integrated in pedagogic curriculum and praxis. The goal is to educate teachers who can meet the challenges the school system are facing, concerning digital learning tools, digital solutions for communication, Internet and pedagogical software. […] In this education the student will write for a 'portfolio', which will be used as basis for assessment and exam*"[3].

Educational Technology and ICT embedded in a curriculum area

Information literacy

This type of knowledge is not anchored either in the Ministry framework or the Universities curricula for PPE. Though the enhanced

2. http://web.plu.ntnu.no/undervis/ppu1/itkurs/index.php
3. http://www.ils.uio.no/studier/PPU/H04/

focus on ICT as a tool in each curriculum area makes an indirect reference to this as a required competence.

Basic computing science

PPE at NTNU writes at their Internet site: "*A central goal for PPE is to make sure new teachers has basic skills in ICT*". They have therefore seen the demand to map their students' basic ICT skills at the start of the Practical Pedagogical Education, and to offer courses in basic computer skills for novices.

Courses on different subject delivered by means of ICT

All University based PPE uses LMS as a tool for students to communicate with each other, and with their teacher. As mentioned, portfolio assessment based on the student activity in the LMS system is now embedded in some of the PPE courses.

PPE at the University of Bergen writes in their curriculum framework: "*It is therefore emphasized […] that the students have meeting places for exchanging and interpreting experiences where they can make use of each others readings and experience of praxis. Some of these meeting places will be organised through use of ICT. The students' direct involvement in the teaching will have an important function for own development*".

How initial teacher training is carried out

The newly revised framework (by the Ministry of Research and Education) for teacher education doesn't have ICT as a compulsory subject syllabus. Therefore systematic data on methods are not available on a national level.

As mentioned, the use of ICT is embedded in the subject syllabus (also in the voluntary curricular areas). There are 22 University Colleges who offers teacher education in Norway. Each University College defines its own subject syllabus, and some have a stronger emphasis on ICT than others. Especially the 5 University Colleges involved in the PLUTO program have had a strong focus on ICT in teacher education.

The University College of Vestfold (HiVE) has embedded ICT as a part of their teacher education: "*All teacher students have their own lap-top, and ICT is used as a tool in teaching, students work and as a communication tool. There will be a great emphasis on student-active learning processes and project based work*".

HiVE also uses digital portfolio as a tool for students to organise their work, and as a tool for student assessment. HiVE also offers two voluntary courses: "*ICT for teachers I and II*" which both are 30 ECTS credits.

The learning goals for "*ICT for teachers I*" are:

- Give a foundation to use ICT in different subject areas in the curriculum.
- To give an understanding for and knowledge in the use of ICT in teaching in school.
- The students should:
  - Know, and be able to reflect around the use of different digital tools and ICT based work forms in educational situations.
  - Be prepared for changes in methods and roles as a consequence ICT used in educational situations.
  - Develop reflected attitudes towards pedagogical use of ICT, and be able to use ICT in different subject areas.
  - To have a reflected attitude on ICT use in social life and work life.

In "*ICT for teachers II*" which further develops the concepts from "ICT for teachers I", the students should learn:

- To design and prepare pedagogical material for digital media, as the Internet.
- Know how learning material could be developed to fit a diversity of technological platforms, and infrastructure.
- Be able to initiate and carry out projects for a group of users within ICT in education.

- Be trained to have understanding for, and have critical insight to assess the use of digital learning material on different subject areas.
- To have an enhanced understanding of how ICT could be implemented the best possible way in everyday school.

As another example, teacher education at the University College of Østfold writes on their internet site: "*The use of ICT in the study are important, and it is expected that the students learn to use this technology to collect information, to write and publish texts and to communicate. To inform the students, the staff and teachers will use e-mail, webpages and digital bulletin boards, and it is the students' duty to access this information*".

These two examples from within the PLUTO-project are examples of good practice.

In-service teacher training: objectives, subject areas and bodies

A distinction is made between in-service training aimed at the updating and renewal of vocational and pedagogical background and skills, and further education involving an extension of the individual's existing qualifications in breadth or depth.

In-service training is flexible in organisation, content and methods in order to meet a variety of needs. It does not always lead to formal qualifications. In-service training may be given as short courses (by a variety of institutions) or organised through innovative projects in the schools (local school-based development and research projects). In-service training may in principle focus on any subject.

Further education has a clearly defined content and scope related to professional competence and professional regulations and leads to additional, formal qualifications.

The current need for in-service training is related to widespread development and innovation in the school system and the demand for individual development and professional updating of the teachers. The goal of the programmes is to prepare the school for a changing society.

The content of in-service training is influenced by current school reforms as well as by the priority given to certain areas by the Ministry of Education. In primary, lower and upper secondary schools, in-service training is often connected to innovation in schools.

In-service training for teachers is organised and run within a variety of institutions/ associations, in a variety of subjects and in courses of varying duration.

Teachers in primary and lower secondary schools have one week of compulsory study and planning during the school year. This is the most regular form of in-service training at the local level available to teachers in compulsory education. It gives no formal credit but should play an important role in updating teachers' knowledge, encouraging work with other teachers and making possible development programmes in the school.

The local education authorities are responsible for the programmes, but the content is to a large extent decided by the teaching staff and administration of the individual school. The training may take place in one school, or groups of schools may join in the same programme for a day or two. Teacher training institutions and specialists in various fields may assist by offering programmes suitable for a study or planning day. The State and the municipal education authorities share the costs.

Similar study and planning days are arranged for teachers in upper secondary schools, five days during the school year. Two annual staff seminars are also held, lasting two days. Among important issues that have been given priority by the Government as well as the schools, are internationalisation, the environment and information technology.

The curriculum for the 10-year compulsory school local curriculum planning has been considered important. In-service training, evaluation and quality development programmes are issues where interest is growing, and for which the Ministry of

Education and Research gives priority. Running such programmes demands qualified personnel, and educational institutions are offering courses to develop competence in this area.

The reform of 1994 of upper secondary education also required the continued education of teachers. Developing and running these courses has been a task for National Education Offices, the Ministry of Education, represented by the Department of Upper Secondary Education and for educational institutions. In this case, schools have chosen teachers to participate, and the participants' task is to pass on the information to their colleagues.

Apart from study and planning days no specific arrangements have been introduced to ensure that the teachers receive in-service training at regular intervals. The only exception is an arrangement for teachers in some schools in northern Norway, introduced as part of a special scheme for the area. Here teachers may take one year's paid leave of absence after a certain time in duty (following a scale depending on the situation of the school). The leave of absence may be used for in-service training or further training.

The responsibilities of counties and municipalities as employers of teachers are stated in the Education Acts of 1998. It is also stated in the 1995 Act on Universities and Colleges that colleges offering teacher training and other higher education institutions should provide in-service training. It is a priority for the national education authorities to stimulate colleges offering teacher training to greater involvement in in-service activities.

In September 2000 the Norwegian Board of Education was established. It is a national unit with responsibility for several tasks in the field of education, among them in-service training for teachers. The Norwegian Board of Education ensures some co-ordination between the main groups of organisers at the national level. Responsibility at the national level lies with:

- The Ministry of Education and Research
- The Norwegian Board of Education
- The universities and certain other teacher training institutions
- The National Council for Vocational Training.

Responsibility at the county level lies with:

- Regional Commissioner
- County Education Committees
- County Vocational Training Boards
- County Co-ordinating Committees.

Responsibility at the local level lies with:

- Municipal Education Committee
- Primary and Lower Secondary Schools
- Upper Secondary Schools
- Municipal Co-ordinating Committees.

In-service teacher training: curricular framework of ICT for education

The national Norwegian programme "*LærerIKT*" (TeacherICT) is an effort focusing on competence building in the educational use of ICT and digital literacy. The Ministry of Research and Education has commissioned the LærerIKT continuous education programme. LærerIKT are a result of the National programme for action "*ICT in Norwegian education, plan for 2000-2003*" launched by the Ministry of Research and Education.

The main goals for LærerIKT are to inspire teachers to start using ICT both in their own teaching, and as an administrative tool in their work. The participants should learn how ICT could be used as a tool in their day-to-day tasks at school, and further develop their own

ICT skills. The work will be in groups of colleagues, and the participants will have guidance from a more skilled teacher who normally works in a school similar to the participant. Both teachers from primary and secondary (lower & upper) could enrol in the programme.
The national Norwegian programme "LærerIKT" was launched in 2001. Since the start in 2001 more than 18,000 teachers have enrolled in the programme. For the year 2002/2003 12,000 teachers enrolled, of which 8,400 carried through (about 70%).
LærerIKT is a web-based in-service education, available for all teachers, both in primary, lower and upper secondary school. The course is aimed at all teachers regardless of previous computer skills. The LærerIKT courses start in the autumn each year. LærerIKT has regional organisers all over Norway.
The programme is based on different modules. There are 5 compulsory modules and 9 voluntary modules, where the participant has to choose 2.
The compulsory modules are:

Module 1: Internet
Module 2: Communication
Module 3: Word processing
Module 4: Spreadsheet
Module 5: Image

The voluntary modules are:

Module 6: Presentation
Module 7: Sound
Module 8: Multimedia
Module 9: Internet publishing/Internet sites
Module 10: Portfolio
Module 11: Differentiated education
Module 12: Library/Resources/Search
Module 13: Computer Games
Module 14: Story line.

How in-service teacher training is carried out

The initiative LærerIKT (TeacherICT) described in the previous paragraph is the only nationally organized initiative for in-service teacher training with focus to heighten the teachers ICT knowledge.

THE COURSE WORK IN LÆRERIKT

Participants follow the course parallel with their regular work as teachers over a period of 6-7 months. LærerIKT starts with a regional 6-hour get-together where participants are introduced to the contents of the course and receive a binder. The participants are divided into groups of between 3 and 4 persons (preferably from the same school), who will co-operate on the module assignments.
At the initial get-together, participants are introduced to the learning platform and the National School Net. Participants also receive a binder containing the 5 common modules and have access to the closed section of the web site. In addition to the contents of the binder, the closed web site comprises key instructions and links to learning resources. At the get-together they also meet up with their tutor.
Participants are required to complete seven modules of which five are common to all participants, and two are chosen from several optional modules. Each module comprises a final assignment to be answered by the group. The module assignments are open, which means that participants can choose the school subjects to which they want to apply the assignment.

LærerIKT is based on process-oriented writing, where dialogue and collaboration within the group and with the tutor are seen as crucial factors. The group first writes a draft for the assignment, sends this to their tutor, who gives comments. Based on the tutors' comments the group edits and re-writes their assignment. The final assignment is then sent to the tutor for approval. The work on the module assignments can form part of the participants' ordinary teaching and planning of activities. The knowledge gained from the course can also be applied immediately in the classroom.
In the assignments, participants describe teaching plans and give concrete examples of how both teachers and pupils can use ICT tools in the classroom.
Participants are given guidance via e-mail by their tutors. All LærerIKT tutors are teachers themselves and work in the same type of school as the participants. In addition to having taken the course themselves, the tutors have followed LærerIKT's training course for tutors.
Both the structure and implementation of LærerIKT is based on process-oriented writing. This applies to the contents of the assignments as well as the way participants answer the assignments. It is an aim for LærerIKT that this approach be reflected in teaching activities.

Teachers actual competencies and tasks in using ICT

The recent study by the Network for IT-research and competence in education (ITU) *ITU-MONITOR*[4] have interesting findings in the teachers use of ICT.

How many times a week do you use a computer at work to:

search the Internet	1-2 occasions 46%, 3+ occasions 40%, never 14%
write text	1-2 occasions 42%, 3+ occasions 45%, never 13%
make a multimedia presentation	1-2 occasions 10%, 3+ occasions 1%, never 89%
use a discussion forum	1-2 occasions 2%, 3+ occasions 0%, never 98%
update your PDA	1-2 occasions 2%, 3+ occasions 0%, never 98%

As this extract shows, the teachers use computers most for basic-skill tasks as word processing and Internet searching. It is though worth mentioning the 13 and 14% who never uses a computer for basic tasks like word processing and Internet search.
In *ITU-MONITOR* there are questions related to the teachers evaluation/reflection on own ICT knowledge:

- *Your general knowledge on ICT* gets an overall 66% in the categories "quite good" and "very good";
- *Your knowledge in word processing* gets an overall 91% in the categories "quite good" and "very good";
- *Your use of graphic software* gets an overall 23% in the categories "quite good" and "very good";
- *To make an Internet site* gets an overall 15% in the categories "quite good" and "very good".

Other questions in *ITU-MONITOR* are

How often do you use a computer at work and home to:

make assessments/tests 63%*
prepare for classes 74%
search the Internet 56%
produce supportive learning material 45 %
register pupils results on assessments/tests 24%
assess work by pupils 18%
rehearse multimedia software 18%

* *Differs strongly between teachers in primary school and teachers in secondary school, with more use by secondary school teachers (upper and lower).*

4. http://www.itu.no/itumonitor/Forside/itumonitorforside

How often do you use a computer in your classes in the following ways:

write work-plans for pupils 63%**
send messages/assignments 45%
produce assessments 35%
supportive teaching 29%
rehears curricular material 28%
tutoring info-search for pupils 19%
learn the pupils communication 8%
demos 5%
simulations 3,5%

** *Differs strongly between primary school teachers and upper secondary school teachers, where primary school teachers at an overall 77 % and upper secondary teachers at 35%*

Problems that teachers face in using ICT in their practice

In the recent evaluation report on LærerIKT (TeacherICT) by *Telemarksforskning-Notodden* one of the questions asked to the teachers enrolled in the LærerIKT programme was:

What are the most important conditions for using ICT in education?

The following alternatives were available:

Maintenance of the school computers and infrastructure - no downtime	56 %
Updating the school computers and infrastructure to modern standards	44 %
Access to qualified technical support when needed	42 %
Internet with broadband	39 %
Buying of more computers for the school	36 %
Coursing in ICT for education	28 %
Access to computers at school to prepare for classes	24 %
Clear goals for use of ICT in education	21 %
Access to pedagogical tutoring when necessary	20 %
Changes in the group of teachers' attitude towards use of ICT in education	8 %
Changes in the schools/teachers tradition for co-operation	7 %
Changes in the organising of the day-to-day school-work	4 %
Changes in the school management's attitude toward use of ICT	3 %

This way of presenting the statistics is in a way turning the question upside-down. But there is reason to believe that the statistics reflects the teachers' experience from their work.

Appendices

APPENDIX A – Paper: *Innovation in Teachers education The Pluto project* ,
available at: http://ulearn.itd.ge.cnr.it/uteacher/national_reports.htm (Norway-Appendix 1).

INFORMATION SHEET OF NORWAY

INITIAL TEACHER TRAINING SYSTEM

Typology of teacher	Educational level	Model of teacher training	Duration	National standard
Pre-primary	Pre-primary (0-6) or 1st-4th grade of lower primary (6-7) *(taking further education for 1 year)*	Trained by university colleges which graduate students.	3 years or 4 years to teach in the 1st-4th grade of lower primary	☐ Yes ☒ No
Primary	Compulsory schools: primary and lower secondary level (6-15)	Trained by university colleges which lead to a teaching degree.	4 years	☐ Yes ☒ No
Secondary	upper secondary level (15-18)	Post graduate qualification: teacher in upper secondary school normally have a Practical Pedagogical Education (PPE – offered by Universities) on top of an academic degree (bachelor or Master) in one or more subjects of specialization.	4 years of academic degree + 1 years of PPE	☐ Yes ☒ No
Vocational	not available	not available	not available	☐ Yes ☒ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

The newly revised framework (April 2003, by the Ministry of Research and Education) for teacher education doesn't have ICT as a compulsory subject syllabus but emphasizes the importance of ICT knowledge for teachers: "*ICT should be a interdisciplinary tool for communication and learning*". The topic "ICT for education", is not specifically addressed as an own discipline: the use of ICT is embedded in the subject syllabus (also in the voluntary curricular areas).

Each University College defines its own curriculum. In some University Colleges, the topic is not prioritised, whilst others have had a strong focus on ICT (used as a tool in teaching, students work and as a communication tool). There will be a great emphasis on student-active learning processes and project based work and also on the use of digital portfolio as a tool for students to organise their work, and as a tool for student assessment. Examples of good practice we find in University Colleges involved in the PLUTO-program, which deals with an innovative and comprehensive restructuring of teacher education.

Focus of training pertaining to ICT for education

☒ use of applications (personnel utilities)
☒ digital literacy
☒ specific subject
☒ use in classroom
☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

The content of in-service training is influenced by current school reforms as well as by the priority given to certain areas by the Ministry of Education. The goal of the programmes is to prepare the school for a changing society. In primary, lower and upper secondary schools, in-service training is often connected to innovation in schools. In-service training for teachers is organised and run within a variety of institutions/ associations, in a variety of subjects and in courses of varying duration. Teachers in primary and lower secondary schools have one week of compulsory study and planning during the school year. This is the most regular form of in-service training at the local level available to teachers in compulsory education. It gives no formal credit but should play an important role in updating teachers' knowledge. The local education authorities are responsible for the programmes, but the content is to a large extent decided by the teaching staff and administration of the individual school. Similar study and planning days are arranged for teachers in upper secondary schools, five days during the school year. Two annual staff seminars are also held, lasting two days. In September 2000 the Norwegian Board of Education was established to ensure some co-ordination between the main groups of organisers at the national level.

Existence of teacher training courses based on ICT? ☒ Yes ■ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

The national Norwegian programme "LærerIKT" (TeacherICT) commissioned by the Ministry is an effort focusing on competence building in the educational use of ICT and digital literacy. The main goals for LærerIKT are to inspire teachers to start using ICT both in their own teaching, and as an administrative tool in their work. LærerIKT is a web-based in-service education, available for all teachers, both in primary, lower and upper secondary school. The course is aimed at all teachers regardless of previous computer skills.

The programme is based on different modules. There are 5 compulsory modules and 9 voluntary modules, where the participant has to choose 2.

The compulsory modules are:

Module 1: Internet
Module 2: Communication
Module 3: Word processing
Module 4: Spreadsheet
Module 5: Image

The voluntary modules are:

Module 6: Presentation
Module 7: Sound
Module 8: Multimedia
Module 9: Internet publishing/Internet sites
Module 10: Portfolio
Module 11: Differentiated education
Module 12: Library/Resources/Search
Module 13: Computer Games
Module 14: Story line

Focus of training pertaining to ICT for education

☒ use of applications (personnel utilities)
☒ digital literacy
☐ specific subject
☒ use in classroom
☐ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

Initial teacher training can be obtained both at universities and polytechnics. At the Polytechnics (*Ensino Superior Politécnico*), the teacher training is provided by the *Escola Superior de Educação* (ESE – higher education college). In what regards study programmes and specialization, we can consider *Polytechnic Training* and *University Training*.

POLYTECHNIC TRAINING

The ESE offers the following courses for initial teacher training:

- initial training courses for nursery teachers (*educadores de infância*)
- initial training courses for 1st cycle teachers of basic education (*professores do 1º ciclo do ensino básico*)
- initial training courses for 2nd and 3rd cycle teachers of basic education (*professores do 2º e 3º ciclos e secundário*) split into different options depending on the disciplines and curricular areas of these cycles.

Cristina Novo
Escola Superior de Educação de Santarém

Cristina Novo is a teacher at the Escola Superior de Educação de Santarém. She's involved in a number of projects on teacher training in ICT for education. Specialized in Education for Children with Special Needs, and continued with a post-graduation in Organization and Evaluation - Distance Education, presently she is in her way to terminate her mastering studies in Education and Multimedia. Her professional areas of interest are: opened and distant learning, software evaluation, ICT and special needs and on-line educational contents, specially in Portuguese.

The ESE may also promote the following courses:

- Complementary training courses aimed at obtaining the degree for nursery teachers and teachers having completed the teacher training course for the 1st cycle basic education, as well as for 2nd and 3rd cycle teachers of basic education and secondary education.
- Specialisation courses, at initial training level, to complement training or post-graduation for pedagogic or administrative work.

Decree-Law n.º 344/89 of 11th October provides the legal framework for teacher training and defines the components of the different initial training courses, in which the number of teaching hours varies according to course type:

- personal, social, cultural, scientific, technological, technical or artistic training;
- educational sciences;
- teaching practice supervised by the training college, including different course activities and which, at the end of the course, may take the form of practical training. Initial teacher training courses for nursery teachers (*educadores de infância*) and teachers of basic education (*professores 1º ciclo*) include initial training in special education.

The same legislation lays down that teacher training courses (where professional qualifications are acquired after scientific qualifications) should be as a whole the equivalent to the pedagogic component of integrated training courses for the same level of teaching, and should include supervised teaching practice. Teacher training for teachers of vocational, professional or artistic disciplines is similar to that outlined above.

The Ministry of Education provides teacher training for teachers with the required scientific, professional, vocational or artistic qualifications, who have not taken a teacher training course, and is legally viewed as initial training.

Teachers who have been teaching for less than 6 years attend a two year training course which is divided into two parts (educational sciences + monitored teacher practice), provided by ESE and known as professionalization in service. These schools also train

those teaching groups not covered by the Open University (http://www.univ-ab.pt /cursos/cprofissionalizacao.html), in the area of the educational sciences.

UNIVERSITY TRAINING

Universities as training units provide courses in initial teacher training for teachers of the 3rd cycle of basic edication and secondary education (lower and upper secondary school teachers).

Initial teacher training for nursery and teachers of basic education and secondary education is also available in universities with their own teacher training units, which is the case in the Universities of Minho, Aveiro, Algarve, Açores and Madeira.

Although the Education Act lays down that the syllabus for higher education is the responsibility of each school providing these courses; as stipulated in legislation dating from 1989, the curricular structure of initial teacher training courses for teachers of the 3rd cycle of basic education and secondary education includes:

- personal, social, cultural, scientific, technological, technical or artistic training;
- educational sciences;
- teaching practice supervised by the training college.

Cultural and scientific training in the respective speciality is more important in the initial training of teachers of secondary education (*ensino secundário*) but should not occupy more than 80% of the total timetable. A different proportion may occur in training models that demand a scientific degree (*licenciatura*) for entry to teacher training.

Initial teacher training courses for teachers of the 3rd cycle of basic education (*ensino básico*) and secondary education (*ensino secundário*) includes initial training in special education.

For practising teachers, without teacher training, but who have an appropriate scientific, professional, vocational or artistic qualification, the Ministry of Education provides the teacher training required to acquire a professional qualification, viewed in legislation as initial teacher training.

Initial teacher training: curricular framework of ICT for education

ICT for education in initial teacher training may or may not be included in the curricula according to each university and polytechnic, except for the case of ICT/Informatics teachers. The trend has been to include in the syllabus of initial teacher training, training on the pedagogical use of ICT, since much debate and efforts towards the knowledge society have taken place in the last decade and progress is visible. Measures to promote ICT in education have been promoted in what regards infrastructure and equipment, national priority for ICT teacher training, development of multimedia contents and innovative projects with European partners. Now almost of higher schools of education include ICT in their syllabus of initial teacher training.

A survey on ICT in the initial teacher training took place in 1997, promoted by the Ministry of Education/Programa Nónio, inquiring universities and polytechnics, whose results were published in a study in 1998 (http://www.dapp.min-edu.pt/ nonio/estudos/formacao_inicial.pdf). An updated survey is taking place, now we have access to a preliminary version and we can monitor progress in http://www.dapp.min-edu. pt/nonio/estudos/AsTiceFormacaoInicial2004.pdf

How initial teacher training is carried out

The study "*As Tecnologias de Informação e Comunicação e a Formação Inicial de Professores em Portugal: radiografia da situação em 2003*" states that ICT are usually present in the curricula of initial teacher training, either in the specific form of dedicated disciplines or integrated in other subjects.

In spite of that, the study identifies two problems in this domain:

a) It appears to be difficult to integrate ICT in the curricula as a tool which can be used whenever its utility is identified. This situation can only arise when the teachers are immerged in a value system that valorises the use of ICT by them.
b) The number of credits corresponding to ICT disciplines is too low.

The first question reminds the difficulty to look at ICT as a work tool, that teachers must use when its utility is identified. This will occur only when teachers' values in ICT change.

The second pointed question suggests that there must be given to more credits to this area, but this necessity must be faced with care, because it's important do not disturb a balance between the technique components and the pedagogical components of use the ICT.

The above mentioned study detected that ICT are used by students mainly in the document production (essentially related to word processing and internet research), but not perceived an actual and effective integration of ICT in many disciplines of the curricula.

Word processing, electronic mail and surfing in the internet skills are spread among students, but the ICT abilities are very limited in the other technician and pedagogical aspects.

Taking into account these findings the report recommends:

1. The higher training institutions must have effective strategies of integration of the ICT in their multiple subjects, balancing pedagogical and technical components.
2. The higher training institutions must identify the specific training requirements of their teachers and act in order to fulfill this needing.

These are some results of the above-mentioned study concerning initial teachers training in ICT, issued by DAPP – Ministry of Education.

The integral version in portuguese language can be consulted in:
http://www.dapp.min-edu.pt/nonio/estudos/AsTiceFormacaoInicial2004.pdf

In-service teacher training: objectives, subject areas and bodies

Considered a "*specific professional right of teachers*", "*the right to training and information for teaching is ensured by access to regular in-service training, geared to up-grade and increase the professional knowledge and skills of teachers, and may also cover professional reconversion as well as career mobility and progress*".

Schools of higher education are particularly well placed to give in-service training, although there are other entities who provide training.

Among these entities, in particular, are the training centres associates with schools, resulting from groupings of schools in certain locations. Teacher associations may set up training centres in compliance with legislation in force. All entities that intend to provide training may only do so once they have been accredited.

Accreditation may be requested from the scientific, teaching body know as the Scientific-teaching Council for In-service Training, which also has the authority to assess the in-service training system.

For the purposes of career promotion, apart from accredited training, teachers may also attend *pós-graduação courses* and for this purpose they may be allowed a sabbatical or receive a scholarship.

The legal regime for in-service teacher training introduces the Training Centres of Associations of Schools for improving teacher training in Portugal. These centres design and promote training plans and each course responds to teacher training needs.

These Training Centres have teaching autonomy as laid down in the pertinent legislation although they still follow the guidelines of the Scientific and Teaching Council for In-

service Teacher Training - *Conselho Científico e Pedagógico da Formação Contínua de Professores* (CCPFCP). Every 3 years, these training institutions are accredited by the above mentioned council which also approves annually the courses proposed by the Training Centres as well as the teacher trainers who have applied to teach.
Apart from the Training Centres of the School Associations, schools of higher education, central and regional services of the Ministry of Education, scientific and teaching teachers' associations may conduct training courses. As training institutions, the first two training bodies mentioned do not need approval because they are already accredited for training.
Decree-Law No. 207/96 (amended by Decree-Law No. 155/99) defines the legal regime for in-service teacher training and lays down how it should be co-ordinated, administered and supported.
According to Decree-Law No. 155/99, it is the responsibility of the CCPFCP to accredit training institutions and in-service teacher training courses, monitor assessment of in-service teacher training and also accredit specialised training courses. Besides that, those on the board are also required to attend meetings, produce scientific studies, individual opinion papers and draw up regulations.
The Ministry of Education jointly with the Ministry of Science and Higher Education intervenes in in-service teacher training by defining priorities, creating national programmes and co-ordinating, administrating and assessing in-service teacher training.

In-service teacher training: curricular framework of ICT for education

The in-service teacher training regime maintains that "*training should ensure that scientific and teaching aspects are included in theory and practice, and encourage learning the different tasks required for a career in teaching*".
In-service training should therefore be based on method and practices similar to those that nursery and teachers will use in teaching.
In-service training, whether centred on school or on practices, includes hours that, apart from group class work, involve trainee teachers working autonomously in a true working context, in the classroom, school and in other spaces of the education community.
As laid down in the in-service teacher training scheme of 1992, passed in 1996, in-service training may take the following forms: training courses; training modules; seminars; training workshops; practical training courses; projects or study circles.
In-service training is geared to perfecting and up-grading the vocational skills of nursery and *ensino básico* primary teachers through training centred preferably on content (courses, modules, seminars), training essentially centred on the school (projects and study circles) and training centred mainly on practices (training workshops and practical training courses).
In-service training courses range from a minimum of 15 hours up to 50 hours. Study circles may reach 75 hours duration. Credits are granted for training according to the number of training hours, and this has an effect on career promotion.
Certain forms of training will take place in the teacher's timetable space allotted to non-teaching activities and may involve "*attendance legally determined or duly authorised, at in-service training courses or at congresses, conferences, seminars and meetings for the study and discussion of issues and problems related to teaching work*".

How in-service teacher training is carried out

The study "*As Tecnologias de Informação e Comunicação na Formação Contínua de Professores : una nova leitura da realidade*" reports that 2,498 in-service teacher training actions were held in 2003 taking the form of training courses, training modules, seminars,

training workshops, practical training courses, projects and study circles. The number of teachers that attended these actions amounted to 15,646.
These actions related to generic software tools (word processing, databases, etc.) and Iinternet (574), school administration and management (79), ICT in transversal subjects and curriculum complement (100) and ICT in specific subject curricular context (64).
In accordance with the opinion of the in-service training centres, ICT in transversal subjects, software tools (word processing, databases, etc.) and Internet have a bigger impact among the teachers than ICT in school administration or in specific subject curricular context.

Table 1
Training ICT impact in in-service teachers

Generic programs (e.g. word processing, databases, etc.)	43% (173)
School administration and management	3% (13)
ICT in transversal subjects	49% (197)
ICT in curricular context	5% (22)

The study summarizes and ranks the main factors of success in ICT in-service teachers training, according to the opinion of the training centres:

Table 2

1	A better teacher practice and professional performance of teachers that use ICT in educative contexts
2	Quality of trainers
3	Expressed teachers necessity in acquire knowledge in ICT
4	Motivation of teachers
5	Practical nature of ICT training
6	Others

But the survey also lists the obstacles of ICT in-service teacher training:

Table 3

1	Equipment (hardware and software): not updated hardware and software, technical problems, insufficient maintenance
2	Facilities: lack of specific room for training, limitation of space, lack of adequate installations to the ICT training
3	Timetable: after labor training
4	Lack of basic ICT skills. Resistance of teachers to ICT training
5	Heterogeneity of basic ICT skills among teachers
6	Financial difficulties to buy equipment
7	Others

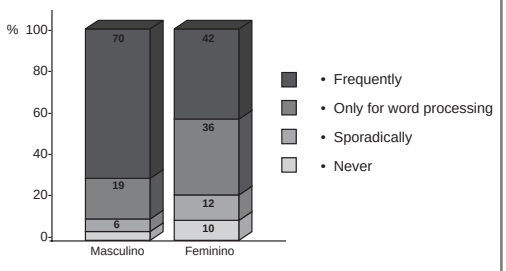
These are some results of the above-mentioned study concerning initial teachers training in ICT, issued by DAPP – Ministry of Education.
The integral version in portuguese language can be consulted in:
http://www.dapp.min-edu.pt/nonio/estudos/Texto_Estudo_27Maio04.pdf

Teachers actual competencies and tasks in using ICT

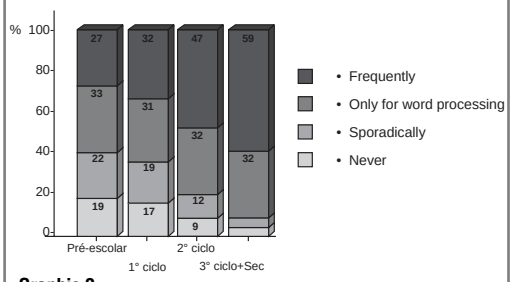
Table 4

Nursery school	7%
Primary school 1st cycle	22%
2nd cycle	18%
3nd cycle/Secundary	53%

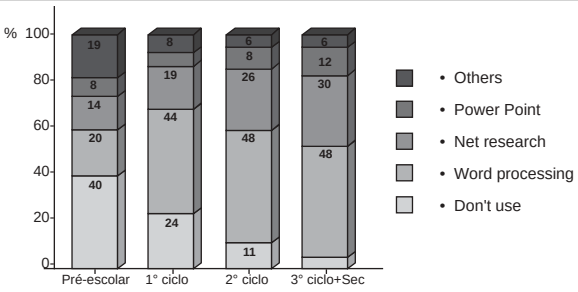
The study "*Tecnologias de Informação e Comunicação: utilização pelos professores*", issued by DAPP – Ministry of Education in 2002 focuses on the teachers competencies and tasks in using ICT and involved 19,337 teachers of the several levels (table 4).
Some data and graphics from this study are showed below.



Graphic 1
How and how often teachers use computers (men and women)



Graphic 2
How and how often teachers use computers (levels)



Graphic 3
Programs that teachers use to prepare their classes

The integral version in portuguese language can be consulted in: http://www.dapp.min-edu.pt/nonio/estudos/Texto_Estudo_27Maio04.pdf

Problems that teachers face in using ICT in their practice

The study (http://www.dapp.min-edu.pt/nonio/estudos/Texto_Estudo_27Maio04.pdf) refers that teachers have more positive than negative attitudes towards ICT. Among these ones, we emphasise negatives attitudes in using ICT:

Table 5

The computer scares me	7%
Don´t know how to induce the use of ICT by pupils	26%
Don't have training	28%
ICT requires news abilities as a teacher	68%
I find insignificant information in the internet for my area	18%
Don't have good conditions in my school	37%
My pupils use ICT better than me	49%
I don't have motivation	22%

Teachers also refer that the poor technical assistance and the insufficient equipment are strong reasons not to use ICT in their practice.

Content areas involved in teachers' competencies profile in ICT for education

There isn't a standard profile and basic curriculum for ICT at national and institutional level. However debates have been promoted by the Ministry of Education and the in-service teacher training centres in the last decade.

A pedagogical use of ICT approach for teacher training has been defended by the main actors involved in this issue (a similar approach to the Danish pedagogical driving licence for teachers). Several workshops/on-line training for ICT teacher trainers were promoted by Programme Nonio in 2001-2002 to discuss a basic curriculum for teacher training and a set of materials were developed to support this curriculum. These materials took the shape of training manuals with practical examples of the integration of the ICT tools in the classroom activity (http://www. dapp.min-edu.pt/nonio/ formacao/4manuais.pdf). These materials were disseminated to the teacher training centres around the country.

Programme Nonio has participated in a European project (PICTTE - Profiles in ICT for Teacher Training) that has tried to define a profile in ICT and a basic curriculum for teacher training, as follows:

Teacher profile in ICT		**Competencies**	
Attitudes	Technological innovation	General Teaching	Teaching Methodologies
	Opening to technology		Planning
	Technology acceptance		Course preparation
	Adaptability/Role change		Media integration
	Learner centeredness		Monitoring/Evaluation
	Learner responsibility		Assessment
	Teacher as service provider		Evaluation of ICT content
	Open to student participation		Safety, legal and ethical issues of the use of ICT
	Mediation		
	Communication facilitator		Project management & Course design
		Subject Teaching	Scientific Updating
			Research
			Resource Evaluation Advice
			Integration in the scientific community
			Linkage to potential partners
			Usage of material in other languages
			Participation in News groups
		ICT Skills	ICT knowledge updating / ICT Tools and platforms
			Familiarity with tools to:
			Communicate
			Collaborate
			Search
			Explore
			Data collection
			Data processing
			Data storage
			Extensions of knowledge
			Tools integration

Appendices

APPENDIX A - *Detailed description of the content areas*
Available at http://ulearn.itd.ge.cnr.it/uteacher/national_reports.htm (Portuguese report).

INFORMATION SHEET OF PORTUGAL

	Typology of teacher	Educational level	Model of teacher training	Duration	National standard
INITIAL TEACHER TRAINING SYSTEM	*Pre-primary*	Pre-primary school (age 3-6)	Initial training courses for nursery teachers offered by Polytechnics.		☒ Yes ☐ No
	Primary	Basic education (age 7-15)	Initial training courses for basic education teachers offered by Polytechnics (1st, 2nd and 3rd cycle split into different options depending on the disciplines and curricular areas of these cycles). Training courses for teachers of the 3rd cycle (lower secondary level) are also offered by Universities.		☒ Yes ☐ No
	Secondary	Secondary education (age 16-19)	Training courses for teachers of the secondary school are offered by Universities.		☒ Yes ☐ No
	Vocational				☐ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

ICT for education in initial teacher training may or may not be included in the curricula according to each university and polytechnic, except for the case of ICT/Informatics teachers. The trend has been to include in the syllabus of initial teacher training, training on the pedagogical use of ICT.

Nevertheless, a survey conducted in 1997, underlined the modest role of ICT in the syllabus of initial training courses and the fact that most initial teacher training courses offered some basic training in ICT tools, but no pedagogical use approach. This approach was more relevant in Maths and Sciences courses and practically absent in Humanities courses.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☒ specific subject
- ☐ use in classroom
- ☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

Apart from the Training Centres of the School Associations, schools of higher education, central and regional services of the Ministry of Education and scientific and teaching teachers' associations may conduct training courses. As training institutions, the first two training bodies mentioned do not need approval because they are already accredited for training.

The Ministry of Education jointly with the Ministry of Science and Higher Education intervenes in in-service teacher training by defining priorities, creating national programmes and co-ordinating, administrating and assessing in-service teacher training.

In-service training courses ranges from a minimum of 15 hours up to 50 hours. Study circles may reach 75 hours duration. Credits are granted for training according to the number of training hours, and this has an effect on career promotion.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

In 2003 2,498 in-service teacher training actions were held taking the form of training courses, training modules, seminars, training workshops, practical training courses, projects and study circles. The number of teachers that attended these actions amounted to 15,646. These actions related to generic software tools (word processing, databases, etc.) and Internet (574), school administration and management (79), ICT in transversal subjects and curriculum complement (100) and ICT in specific subject curricular context (64).

In accordance with the opinion of the in-service training centres, ICT in transversal subjects, software tools (word processing, databases, etc.) and Internet have a bigger impact among the teachers than ICT in school administration or in specific subject curricular context.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☐ specific subject
- ☒ use in classroom
- ☒ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

All who wish to teach in publicly funded nursery, primary and secondary schools in Scotland are required to have undergone initial training and to hold a Teaching Qualification (TQ) in order to be registered with the General Teaching Council for Scotland (GTCS). Registration is a requirement before a teacher can be employed by an education authority.

A Teaching Qualification may be gained by one of three routes:

- To become a primary teacher or a secondary teacher of technology, physical education or music it is possible to take a 4-year course leading to a Bachelor of Education (BEd) degree at one of five teacher education institutions.
- To become a secondary teacher in certain subjects it is possible in some higher education institutions to take a combined degree which includes subject study, study of education and school experience.
- For those who already hold a university degree and wish to teach in either a primary or a secondary school, a one-year course for a Post-Graduate Certificate in Education (PGCE), i.e. leading either to a Teaching Qualification (Primary) or a Teaching Qualification (Secondary), is offered by the teacher education institutions. Teachers in colleges of further education may, and the majority do, undertake training leading to a Teaching Qualification (Further Education). They may also thereafter register with the GTC. There is, however, no legal requirement for them to do either.

John Dixon
University of Glasgow

John Dixon works in the Department of Educational Studies at the University of Glasgow. His main tasks revolve around preparing undergraduate and post-graduate students for entry into the teaching profession, and in this context he has been involved in research and teaching in the uses of ICT in education for over 20 years.

OBJECTIVES

The Scottish Ministers, through the Scottish Executive Education Department (SEED), control the training of teachers in Scotland in a number of ways. Approval by the Scottish Ministers is required for courses of training for teachers in schools. Guidelines are published by the SEED which lays down conditions under which that approval is given. Minimum entry requirements to teacher training are nationally prescribed and published annually in the Memorandum on Entry Requirements to Courses of Teacher Education in Scotland, which has the force of regulation.

The Guidelines for Initial Teacher Education Courses (1998) encourage teacher education institutions to ensure that their courses use practical experience in schools as a context for the consideration of the theoretical aspects of education. They are expected to design courses that develop the competencies which the new teacher will require in order to teach effectively, which will encourage students to study independently, and which will enable them to reflect on their work in the classroom. This implies an active role for the student in learning and variety in the way in which the tutors present their teaching.

Assessment of teachers in training is carried out by members of staff in the teacher education institutions in co-operation with the supervising teachers in school placements, and in recent years schools have been encouraged to play a greater part in this assessment. There is also for each course an external examiner who has good practical experience of the stage of schooling involved and who samples the assessments made by staff of the

teacher education institution and comments on them. Assessment of other elements of the course is by written examination or, as is becoming more common, by submission of project work undertaken by the student.
On successful completion of the course students are awarded a TQ which entitles them to registration with the General Teaching Council for Scotland (GTCS) in the category for which they have trained, provided that they meet the GTCS's medical requirements. They also have a profile which is intended for the information of employing authorities and the schools to which they are first appointed. This profile sets out the competencies which they have achieved and their areas of expertise. The GTCS will also require satisfactory evidence that the newly qualified teacher does not have a criminal record which would make him or her unsuitable to work with children.
From August 2002, all newly qualified teachers will have access to a training post for one school year immediately following qualification. The training post will have a maximum class commitment of 0.7 Full Time Equivalent (FTE), with the remaining 0.3 available for professional development. Each trainee will have access to a nominated induction tutor within the school to provide advice, support and guidance. To become fully registered, probationers will have to meet the standards set out in the Standard for Full Registration (SFR).

CONTENT AREAS

Teacher education is offered in the Faculties of Education of the universities.
The document "*Guidelines for Initial Teacher Education Courses*", published in 1998 by the SOEID (now SEED), sets out general and specific conditions for all courses which involve the training of school teachers. It deals with safeguards for academic standards, acceptability to the General Teaching Council for Scotland (GTCS), the professional orientation of the course, the importance of experience in schools, the need for joint planning of such experience with school staff, and the time to be spent on school experience in each type of course. It sets out the general competencies which are seen as prerequisites for entry to the teaching profession: subject knowledge, competence in communication, in classroom methodology, in classroom management and assessment, knowledge about schools and professional awareness. Also included is a list of desirable attitudes in a teacher which the course should encourage.
The minimum entrance requirements for places on teacher education courses in Scotland are set out annually in the publication "*Memorandum on Entry Requirements to Courses of Teacher Education in Scotland*".

INITIAL TRAINING OF PRE-SCHOOL AND PRIMARY SCHOOL TEACHERS

All primary teachers in training are given some experience in the pre-school education environment during their initial training and part of their work in the teacher training institution is devoted to this stage. It is not possible in Scotland to train specifically as a nursery teacher during initial training. Nursery teachers must first obtain a Teaching Qualification. The admission requirements for teachers in nursery schools and departments are the same as for primary teachers.
A majority of primary teachers enter the profession through the course leading to a Bachelor of Education (BEd) degree. A much smaller number each year enter through the Post-Graduate Certificate in Education (PGCE) course.
Entry qualifications to the 4-year course leading to the BEd degree and a Teaching Qualification (Primary Education) are very similar to the general qualifications for entry to university in Scotland. Candidates are expected to hold the Scottish Qualifications

Certificate with three passes at Higher level and achievement of Grades 1, 2 or 3 at Standard Grade in two further subjects. More specifically, for entry to a BEd course, a pass in English at Higher level and a pass in Standard Grade at Grade 1 or 2 in Mathematics are necessary (or equivalent qualifications). There is a minimum entry age of 17 to BEd courses. Entry to the one-year PGCE course leading to a TQ (Primary Education) requires the candidate to hold a degree of a United Kingdom university or of an equivalent standard from an institution outwith the UK, and passes in English at Higher level and Mathematics at Standard Grade (at Grade 1 or 2) of the Scottish Qualifications Certificate (or equivalent qualifications), are necessary.

Courses leading to the Teaching Qualification (TQ) (Primary Education) are based on the "*Guidelines for Initial Teacher Education Courses*" (1998) published by the SEED. For students aiming at the TQ (Primary Education) the BEd degree (a 4-year course) is directly related to the task of teaching pupils in the age range 3-12 in nursery and primary schools, but it must also provide intellectual challenge and a basis on which to build further training later in a teacher's career.

There are three major elements in the course: professional studies, curriculum studies, and school placement experience. Thirty weeks are spent in school experience which provides a focus for the whole course. It offers an opportunity to observe children and teachers; to practise different teaching styles; to develop the attributes of a primary teacher; and to gain some experience of the operation of a school as a whole.

Closely related to school experience is that element of the course designated professional studies, which is intended to give students the knowledge, skills, insights and attitudes that allow them to operate effectively in the primary school. It covers teaching methods (planning, delivery, assessment of pupils, and self-evaluation) and studies of the educational and social contexts of nursery and primary schools, of child development, and of the nature of the learning of children from age 3 to age 12.

The third element covers studies in the primary school curriculum to ensure that intending teachers have a reasonable level of competence and confidence to teach all areas of the curriculum. In addition to these three key elements of the primary BEd course the structure provides students with opportunities to choose particular areas for special study (e.g. Music, Computing, Modern Foreign Languages, Early Education, or Special Educational Needs). At present, considerable encouragement is being given to students to choose a modern foreign language.

The one-year PGCE course for primary teachers is intended to provide professional training for students who have already experienced at least three years of higher education and obtained a degree. It contains the same three closely inter-related elements: school experience, professional studies and curricular studies. As in the 4-year BEd course, the school experience element provides the focus for the training. The professional studies part of the course forms a single, coherent programme which, because of the constraints of time available, has to include the essential theoretical basis of the practice of teaching. The principal aim of curricular studies, constrained also by time, is to ensure an ability to plan, implement and evaluate teaching programmes in Language, Mathematics, environmental Studies, religious and moral Education, and the Expressive Arts (Art, Music, Drama and Physical Education), with perhaps special attention to the expressive arts in which post-graduate students are unlikely to have had much involvement during their degree courses.

INITIAL TRAINING OF SECONDARY SCHOOL TEACHERS

Most students aiming at the TQ (Secondary Education) take the one-year PGCE course. As in other teacher education courses, the period of school experience is considered to be of the greatest importance and students on this course must spend 18 of their 36 weeks

in school placements. Professional studies, which are expected to be intellectually challenging and have explicit concern with the classroom and professional needs, have a place in the institution's element of the course as have subject studies through which students learn to relate their specialist subjects to the school curriculum, develop strategies and methods for teaching their subjects, and, in some instances, study further aspects of their subjects which are part of the school curriculum but have not been studied in their degree course. In the University of Stirling professional training is offered concurrently with certain normal degree courses. Students take one of professional studies during their course and another (which includes the school placement element demanded by the Guidelines) after their main degree is completed, thus giving three and a half years for a General degree or four and a half years for an Honours degree which also provides a TQ (Secondary Education).

Although the three elements of the 4-year BEd courses leading to a TQ (Secondary Education) in music, physical education and technology are the same as in the post-graduate course, subject studies assume a greater role as the aim of the course is to produce specialists. The music degree, for example, demands a high standard of practical musicianship and performance. Thirty weeks of placement are required in these courses, of which six in the case of the BEd (Technology) will be a placement in industry.

Admission Requirements (Secondary)

Most secondary teachers enter the teaching profession, after taking a degree, through the Post-Graduate Certificate in Education (PGCE) course. A few enter through the Bachelor of Education (BEd) degree which is offered in a limited number of subjects and a few through combined degrees which include subject study, study of education and school experience.

Entry to the PGCE course leading to a Teaching Qualification (TQ) (Secondary Education), which is awarded in a named subject or subjects, requires a degree of a United Kingdom university (or one of an equivalent standard from an institution outwith the UK) in which the candidate has sufficient breadth and depth of study for teaching the subject in Scottish secondary schools. A pass in English at Higher level, or an equivalent qualification, is also necessary.

Initial teacher training: curricular framework of ICT for education

In a set of twelve core professional interests for ITE courses, the Standard document includes undertaking a range of approaches to teaching to facilitate the learning of pupils, including the appropriate use of Information and Communications Technology (ICT).

In describing the approaches to learning, teaching and assessment which ITE course are expected to adopt particular attention will be paid to the effective use of ICT to facilitate learning and teaching. ITE courses are expected to reflect the tripartite model of professional competence outlined in the Standard.

In terms of Professional Knowledge and Understanding, Benchmark 1.1.2 states that ITE students must acquire the knowledge and understanding to fulfil their responsibilities in respect of literacy and numeracy; personal, social and health education; and ICT as appropriate to the sector and stage of education.

Specifically, with respect to ICT, this means demonstrating the knowledge and understanding laid out in the "*Guidance on the use of ICT with Courses of Initial Teacher Education*" (1999), which states that it is not the intention, nor is it necessary, to create additional competencies relating to ICT.

The five categories of skills and knowledge outlined on the following page(s) constitute a framework to assist in planning the integration of ICT into courses of ITE. A similar

framework will guide the delivery of the ICT training of existing teachers funded from the New Opportunity Fund. Thus the framework creates a means of ensuring that the ICT competence of newly trained teachers has been achieved in ways which form a suitable basis for continuing professional development.

The five categories of this framework are:

1. *Working effectively with ICT in Teaching and Learning:* being aware of the potential of ICT to support a range of information, communication and learning purposes in relation to the teaching and learning environment; knowing how to use, adapt, integrate, plan and manage the use of ICT to create an effective environment for themselves and their pupils including those with special educational needs.
2. *Evaluating and selecting ICT resources:* judging the quality and appropriateness of ICT for a range of tasks, levels, subject, ages, and abilities and evaluating and selecting appropriate ICT based resources/sources to enhance learning.
3. *Monitoring, evaluating and assessing teaching and learning:* judging pupils' ICT capabilities and the effectiveness of pupils' use of ICT in achieving learning objectives; applying ICT in the monitoring, assessment, recording and reporting of learning; reflecting on their own use of ICT in a teaching, learning and management context; assessing their own use of ICT capabilities.
4. *Developing ICT capabilities identifying ICT skills and knowledge needs of pupils and themselves*: planning and providing pupils with opportunity to develop ICT skills and knowledge within the context of the subjects/levels at which they are teaching; planning and prioritising their own ICT development.
5. *Technical skills and applications:* knowing about, and using, a range of hardware and software for a range of information, learning and communications tasks; knowing about the ethical, legal and health and safety implications of using ICT.

Thus all ITE students in Scotland have a grounding in the educational uses of ICT upon which future CPD should be built.

How initial teacher training is carried out

ITE in Scotland takes place in the traditional university sector. ITE courses tend to be a blend of lectures, seminars, tutorials and workshops on campus, and practical activities and experiences whilst on placement in schools. Increasing use is being made on most Scottish ITE courses of various forms of ICT. In particular, most courses now employ an Online Learning Environment of one form or another. Some have invested in commercial products, such as WebCT or Blackboard, whereas others have chosen the open-source route and are using programmes such as Moodle.

Whilst no systematic evidence is available of the quality of their usage, in ITE, as in other academic areas, courses will go through a cycle of assimilation and accommodation.

In-service teacher training: objectives, subject areas and bodies

The term Continuing Professional Development is now used in Scotland to cover the range of in-service provision.

Teachers can expect to receive advice and be encouraged to undertake approved courses of study and learning. They can identify their own in-service training needs at any time. However, the process of Staff Development and Review allows teachers the opportunity to discuss their performance over the previous year with their line manager and for agreement to be reached on any additional or further training which may be required. Revised guidance entitled Staff Development and Review Guidelines and Checklist was distributed to all local authorities in 1998 by the SOEID (now SEED),

and in line with these Guidelines, a new national framework of competencies, standards and associated for the Continuing Professional Development (CPD) of teachers has been devised.

Under the terms of the agreement on the McCrone Committee recommendations, a total of 35 hours of Continuing Professional Development (CPD) per *annum* has been introduced as a maximum for all teachers. The time is to be spent on an appropriate balance of personal professional development, attendance at nationally accredited courses, small scale school-based activities or other CPD activity, the balance to be determined following an assessment of the individual teacher's needs and taking into account school, local authority and national priorities.

Introduction

Progression to and through the chartered teacher status right up to head teacher is now to be by qualification. To obtain promotion it will be necessary for teachers to complete successfully a number of modular courses of continuing professional development.

Types of institution and provision

A number of different bodies are involved in providing staff development at national, education authority and school levels, but the main bodies are the education authorities, the schools themselves, often with the help of outside support, and the teacher education institutions. A number of national conferences are also mounted annually by the SEED, usually in the teacher education institutions. Other national bodies, such as Learning and Teaching Scotland (LTS), run courses which teachers may apply to attend.

In-service teacher training: curricular framework of ICT for education

In-service teacher training in the uses of ICT in Scotland has involved a range of Government, local authority and University provision. The recently completed NOF (New Opportunities Fund) project provided ICT training for all serving teachers in Scotland, employing the five point ICT curriculum framework laid out in Guidance on the use of ICT with Courses of Initial Teacher Education (1999):

1. *Working effectively with ICT in Teaching and Learning*
2. *Evaluating and selecting ICT resources*
3. *Monitoring, evaluating and assessing teaching and learning*
4. *Developing ICT capabilities identifying ICT skills and knowledge needs of pupils and themselves*
5. *Technical skills and applications.*

See above detailed description in section *Initial teacher training: curricular framework of ICT for education.*

COMPETENCIES

Information and Communications Technology (ICT) has the potential to improve the quality and standards of pupils' education and to provide considerable support for teachers both in their classroom and administrative role. The Government has recognised this potential by giving high priority to developing the ICT infrastructure in schools and to training teachers in the classroom use of ICT.

The planned increase in ICT infrastructure in schools and the introduction of the National Grid for Learning makes it important for teachers to be confident and competent in using ICT effectively in the classroom. This document sets out a draft framework describing what every teacher should be able to do after receiving training from the New Opportunities Fund scheme.

FOCUS OF THE GUIDANCE

This guidance emphasises the importance of the effective integration of ICT within the teaching and learning environment. It is not primarily concerned with the teaching of IT capability. The focus of this guidance is on good teaching.

INTRODUCTION TO THE SKILLS AND KNOWLEDGE CATEGORIES

The knowledge, understanding, critical thinking and practical skills, associated with the effective use of ICT by newly qualified teachers, are presented in five broad categories:

1. *Working effectively with ICT in teaching and learning*: being aware of the potential of ICT to support a range of information, communication and learning purposes in relation to the teaching and learning environment; knowing how to use, adapt, integrate and plan the use of ICT to create an effective learning environment for themselves and their pupils.
2. *Evaluating and selecting ICT resources*: judging the quality and appropriateness of ICT for a range of tasks, levels, subjects, ages and abilities and selecting appropriate ICT based resources/sources to enhance their own learning.
3. *Monitoring, evaluating and assessing teaching and learning*: judging pupils' ICT capabilities and the effectiveness of pupils' use of ICT in achieving learning objectives; applying ICT in the monitoring and assessment of learning; reflecting on their own use of ICT in a teaching and learning context; assessing their own use of ICT capabilities.
4. *Developing ICT capabilities*: identifying lCT skills and knowledge needs of pupils and themselves; planning and providing pupils with opportunity to develop ICT skills and knowledge within the context of the subjects/levels at which they are teaching; planning and prioritising their own ICT development.
5. *Technical skills and applications*: knowing about and using, a range of hardware and software for a range of information, learning and communication tasks; knowing about the ethical, legal and health and safety implications of using ICT.

In the guidance which follows, these five categories are expanded to represent the skills and knowledge appropriate to the non-ICT specialist. The first four categories represent the skills and knowledge which relate to the integration of ICT into the teaching and learning environment in nursery, primary or secondary schools. While it is recognised that the fifth category, *technical skills and applications*, is still important, it is seen as underpinning the more challenging professional uses of ICT represented in the first four areas. Technical skills and knowledge of ICT applications should not be seen as an overall goal in ICT education, although the importance of reaching a certain level of technical ability in order to be able to apply ICT in a professional capacity should be recognised.

While the guidance is aimed at non-ICT specialists, it is important to recognise the role that any teacher can play in developing and reinforcing pupils' ICT capabilities in relation to their own area of the curriculum. This is covered in the category *Developing ICT capabilities.*

These areas of ICT skills and knowledge should not be considered in terms of a developmental sequence. The effective use of ICT requires a mix of skills and knowledge from across all five categories. It is, therefore, important not to create artificial boundaries between these skills and knowledge areas when developing ICT capability. The most effective learning will take the form of iterative 'learning loops'. Appropriate ICT skills and knowledge are best developed in relation to a 'real' task which motivates the learner. As a consequence of using ICT in a meaningful way the learner will be encouraged to extend their skills and knowledge in relation to more challenging tasks and ideas. This

spiral of reinforcement and extension once again stresses the value of integration of ICT both within the curriculum of initial teacher education, and in relation to the priorities goals and inspiration of practising teachers.

ICT SKILLS AND KNOWLEDGE CATEGORIES

The statements in each of the following categories represent the ICT skills and knowledge which teachers should have at the end of training offered under the New Opportunities Fund scheme.

A. WORKING EFFECTIVELY WITH ICT IN TEACHING AND LEARNING

By the end of NOF funded training, teachers should

1. Have an understanding of the potential, benefits and limitations of ICT to support a range of different teaching and learning strategies:
   - with individual pupils, groups and whole classes;
   - with a range of abilities, age ranges, subjects and levels as appropriate.

   e.g. Shared experience through large screen viewing, use of shared files. Individualised learning through the use of tutorial packages, etc.
2. Be aware of the potential of ICT to support, and to overcome barriers to the learning of pupils with special educational needs.

   e.g. Overlay keyboards, trackerballs and joysticks, speech feedback, touch screens, spellcheck, etc.
3. Be aware of the potential of ICT to support their own learning and professional development.

   e.g. Distance learning, e-mail discussion lists.

   Educational support networks such as Virtual Teacher Centres

   (National: http://vtc.ngfl.gov.uk - Scottish: http://www.svtc.org.uk).
4. Be aware of the broader potential of ICT to support:
   - the work of the school as a whole;
   - and its interaction with its local community;
   - the broader education community.

   e.g Administration, decision-making and communication.

   Communication with parents and guardians, accessing relevant external expertise, communication with other relevant professionals concerned with education and welfare. Communicating and co-operating with other schools, keeping up-to-date on national legislation and guidelines.
5. Know how to apply a range of ICT appropriately:
   - in support of learning objectives and curriculum goals;
   - within a range of teaching strategies;
   - with individual pupils, groups and whole classes;
   - with a range of abilities, including special educational needs, as appropriate.
6. Know how to apply and integrate ICT within the classroom and in their own professional development as a source of information as a creative medium and as an educational medium including:
   - in finding, evaluating, selecting, manipulating, creating, organising, presenting and communicating information in relation to learning objectives;
   - in developing core and transferable skills;
   - developing subject specific knowledge and skills;
   - identifying and evaluating new research and ideas relevant to their professional roles.

   e.g. Developing effective search strategies (including use of indexes, directories, logical operators) and interpreting retrieved information, creating images, worksheets, web pages and templates.

Core/transferable skills: literacy and numeracy, information and learning skills, etc.

7. Know how to use ICT to communicate with pupils clearly and in a stimulating manner.
   e.g. Creating on-screen presentations using colour, sound, moving images, etc.
8. Know how to use ICT to communicate effectively with colleagues and the wider community as appropriate.
9. Understand how to manage ICT effectively with individual pupils groups and the whole class with a view to providing fair and equal access to resources and support.
   e.g. Exploring the possibility of mixing more confident children with less confident to ensure access to support.
10. Be able to plan their use of ICT in the classroom effectively in terms of:
    - access to equipment;
    - subject/curriculum content;
    - teaching strategy and tasks;
    - classroom management;

    in order to achieve learning objectives.
    e.g. Timetabling use of equipment and inter-departmental cooperation;
    dividing time between ICT and non-ICT based teaching and learning as appropriate.
11. Be able to judge when a ICT resource could be used spontaneously in the classroom.
12. Know how to use ICT to generate and exchange ideas and stimulate discussion:
    - among pupils;
    - among colleagues.

    e.g. Facilitate formal and informal interchanges through the use of e-mail, video conferencing, etc.
13 Know how to use ICT with pupils in a way which is both stimulating and challenging.
14. Be aware of appropriate sources of guidance and support for ICT use with pupils (including those with special educational needs) and in their own professional development.
    e.g. The NGfL http://www.ngfl.gov.uk
    The Virtual Teacher Centres
    BECTa (British Educational Communication and Technology agency):
    http://www. becta.org.uk
    SCET (Scottish Council for Educational Technology): http://www.scetcom
    Software such as: Reading the reader CD-ROM, Scottish Office - PC version launched 1998.
15. Know when it is appropriate to seek advice regarding the use of ICT for pupils with special educational needs. This is a field of rapidly changing ICT developments.

B. EVALUATING AND SELECTING ICT RESOURCES

By the end of NOF funded training, teachers should

1. Be aware of a wide range of ICT hardware and software relevant to different abilities, age ranges, subjects and levels as appropriate.
   e.g. The Internet, e-mail, CD-ROM, local area networks, simulations, calculators, spreadsheets, etc.
2. Be aware of appropriate sources of information and advice (including electronic sources), and how to use them, to help them identify and select ICT resources.
   e.g. Information professionals organisations such as
   SCET: http://www.scet.com - BECTa: http://www.becta.org.uk
   SCCC (Scottish Consultative Council on the Curriculum): http://www.sccc.ac.uk

3. Be able to compare and contrast a wide range of ICT and non-ICT based resources when selecting the most effective and appropriate resource for the task.
4. Be able to evaluate the content of ICT resources in relation to:
   - learning objectives;
   - specific subject/topic in question;
   - age range of pupils;
   - pupils' stages of development (individually and as a whole);
   - pupils' abilities (including those with special educational needs);
   - pupils' social and cultural background, including their language (when it is appropriate to do so);
   - ethical and legal considerations.
5. Be able to evaluate the quality of information provided by ICT resources in relation to accuracy, validity, reliability, plausibility and bias.
   e.g. The levels of editorial scrutiny on the Internet, the date of publication, etc.
6. Be able to take account of classroom management issues when selecting ICT resources.
   e.g. Can pupils work through a package within the timescale of a lesson?
   Does the licence agreement for a package allow whole class use?
7. Be able to evaluate and select ICT resources/sources appropriate to their own needs and goals:
   - for information;
   - in professional development;
   - in management and planning.

C. MONITORING EVALUATING AND ASSESSING TEACHING AND LEARNING

By the end of NOF funded training, teachers should

1. Be aware of the potential of a range of ICT to support the assessment and reporting process.
   e.g. The use of spreadsheets and word-processing to administer and report on assessments.
2. Know how ICT could be used to record and report on the aptitudes, needs and progress of pupils (including their ICT capabilities and needs).
   e.g. Use of databases and spreadsheets to record, analyse and share data on pupil performance.
3. Be able to monitor and assess pupils' development of ICT capability within the context of the levels and subject(s) taught.
4. Be able to monitor and assess progress in achieving learning objectives (their own or their pupils) in ICT-mediated learning and be able to see beyond the various advantages the use of ICT provides.
   e.g. Spellcheck facilities may mask a difficulty with spelling, verbatim use of downloaded information may mask a lack of understanding of the subject.
5. Be able to judge the point at which it is useful to intervene in pupils' use of ICT - not so early as to restrict pupils' problem-solving skills, not so late that the pupil has become disillusioned.
6. Be able to reflect on their own use of ICT in relation to achieving teaching, learning and management objectives and be able to justify decisions made or to make the necessary alterations.
   e.g. Are objectives being met? Are the pupils being challenged? What contribution is ICT making to learning? Is ICT being used imaginatively and effectively for presentation purposes? Is ICT contributing to efficiency and effectiveness?

D. DEVELOPING ICT CAPABILITIES

By the end of NOF funded training, teachers should

1. Know how to develop pupils' ICT capabilities within the context of the learning objectives, teaching strategies and tasks of their curriculum area.
2. Know how to teach pupils to apply ICT, where appropriate, to meet their information, learning, and communication needs in relation to the curriculum.
   e.g. Finding, evaluating, selecting, manipulating, creating, organising, presenting information and ideas as appropriate. Developing skills and knowledge appropriate to subject, task and/or learning objectives. Communicating with a range of audiences (e.g. peers, teachers).
3. Be aware of the importance of helping pupils make the connection between the use of ICT in the immediate learning context and its wider application to learning situations outside school.
   e.g. The value of word-processing in correspondence or report writing, CAD (Computer Aided Design) packages in industry.
4. Be able to raise awareness amongst pupils of legal, ethical and health and safety issues relating to the use of ICT. See E6 for examples.
5. Be able to develop pupils' awareness of the correct procedures, terminology, etiquette in relation to the use of ICT. See E7 for examples.
6. Know how to develop pupils' abilities to select appropriate ICT resources based on an evaluative comparison of a range of ICT and non-ICT based resources. See B4 for further detail.
7. Have the ability to ask key questions that help pupils reflect on the appropriateness of their use of ICT.
8. Be aware of the importance of school development planning in relation to the effective integration of ICT.
9. Be able to identify and prioritise their own professional development needs in relation to ICT skills and knowledge, and integrate the development of ICT capabilities into personal development plans.
10. Be able to identify appropriate training that would meet their ICT professional development targets.
    e.g. Distance learning, self directed study, INSET courses.
11. Should be able to provide models of good practice through their own use of ICT.

E. TECHNICAL SKILLS AND APPLICATION

By the end of NOF funded training, teachers should

1. Have an understanding of the potential and limitations of ICT to facilitate data storage and transfer.
   e.g. Memory size, compression of files, speed of transfer of data, etc.
2. Be able to apply key features and functions of a range of ICT hardware and software (generic software, reference sources and subject/context specific educational packages) to fulfil a purpose/task.
   e.g. Key features/functions: loading/running software, file management, using common user interfaces, using menus and cutting, pasting, copying files/data within and between applications.
   Generic: word-processing, spreadsheets, e-mail, presentation software.
   Reference sources: the multimedia encyclopaedia, the Internet.
   Subject/context specific simulations, control programmes.
3. Have a knowledge of basic trouble-shooting procedures and ability to perform routine maintenance.

e.g. Use of on-line help features, user manuals, routine, checking connections, good practice in avoiding viruses and setting up ICT equipment.

4. Be aware of the potential of ICT, and be able to use ICT effectively and efficiently to: measure record and report; find, evaluate, and select information; analyse and manipulate data and information; create information and ideas; present information, knowledge and ideas; communicate information, knowledge and ideas; develop materials; plan and manage their own time and tasks.
5. Be able to use ICT to communicate effectively both locally and over distance.
   e.g. Use of e-mail for internal and external communications.
6. Have an awareness of legal, ethical and health and safety issues relating to use of ICT in a teaching and learning environment.
   e.g. Legal issues: the Data Protection Act, copyright legislation, material that is illegal in this country.
   Ethical issues: data confidentiality, pornography on the Internet, acknowledging information sources, methods of monitoring ICT use, etc.
   Health and Safety issues: awareness of the legislation relating to the use of computers, awareness of illnesses that could potentially be induced though ICT use (e.g. Repetitive Strain Injury, problems with vision) ability to recognise potential hazards and reduce risks (through the use, for example, of ergonomically appropriate furniture).
   Useful publication: Symonds. M., *Copyright and ethics in the digital age: developing an informed approach to digital copyright* (a guide for Scottish schools and colleges), Glasgow, SCET, 1998.
7. Be aware of the correct procedures, terminology, etiquette with regard to the use of ICT.
   e.g. The importance of security (passwords, etc.), creating back up files, checking for viruses, care in use of language in e-mail (interpretation of humour, use of capital letters), obeying agreed procedures in video conferencing, etc.

Masterclass Programme

A new intiative in Scotland is the MasterClass programme, launched in September 2002, which aims to:

- establish a shared vision of the potential and challenges of ICT in learning at all levels;
- influence, guide and support pedagogical change using ICT across Scotland;
- provide inspiration and encourage effective leadership in the embedded use of ICT in learning, teaching and management;
- develop and share expectations of good management of ICT at all levels;
- contribute to the ongoing development of a toolkit to support the effective use of ICT at all levels;
- create a community that is able to implement and sustain the vision;
- facilitate the dissemination of good practice in the use of ICT across Scotland.

How in-service teacher training is carried out

Increasing use is being made of OLE's to complement traditional face-to-face CPD in Scotland. Some programmes operate almost entirely online, although these are the exception rather than the rule. There persists the popular cultural belief that the proper development of competence is best accomplished in a face-to-face manner.

Teachers actual competencies in using ICT

No systematic evidence is available on this. The evaluations of the various CPD programmes in the area of ICT suggest that there is a problem in transferring new skills into the classroom.

Problems that teachers face in using ICT in their practice

Learning to properly embed ICT into existing pedagogic practice, let alone developing such practice in new directions to account for the potential power of ICT, faces many impediments in Scotland. These may be classified as:

- Resource problems – financial constraints in the education sector have inhibited investment for a number of years, not just in ICT provision, but in general infrastructure too.
- Attitudinal problems – many teachers remain to be convinced that, in times of constraint, spending on ICT is fully justified.
- Competence problems – many teachers, still uncomfortable using overhead-projectors, find a claimed lack of training is a useful excuse for avoiding engagement with ICT developments.
- Curriculum problems – the highly centrally prescribed nature of the predominantly content-curriculum in Scotland renders many teachers reluctant to engage in 'experiments' with the way in which subject matter is traditionally taught.

Content areas involved in teachers' competencies profile in ICT for education

"*The Guidance on the use of ICT with Courses of Initial Teacher Education*" (1999) outlines the following five point curriculum framework for ICT in ITE in Scotland:

1. *Working effectively with ICT in Teaching and Learning:* being aware of the potential of ICT to support a range of information, communication and learning purposes in relation to the teaching and learning environment; knowing how to use, adapt, integrate, plan and manage the use of ICT to create an effective environment for themselves and their pupils including those with special educational needs.
2. *Evaluating and selecting ICT resources:* judging the quality and appropriateness of ICT for a range of tasks, levels, subject, ages, and abilities and evaluating and selecting appropriate ICT based resources/sources to enhance learning.
3. *Monitoring, evaluating and assessing teaching and learning:* judging pupils' ICT capabilities and the effectiveness of pupils' use of ICT in achieving learning objectives; applying ICT in the monitoring, assessment, recording and reporting of learning; reflecting on their own use of ICT in a teaching, learning and management context; assessing their own use of ICT capabilities.
4. *Developing ICT capabilities:* identifying ICT skills and knowledge needs of pupils and themselves; planning and providing pupils with opportunity to develop ICT skills and knowledge within the context of the subjects/levels at which they are teaching; planning and prioritising their own ICT development.
5. *Technical skills and applications:* knowing about, and using, a range of hardware and software for a range of information, learning and communications tasks; knowing about the ethical, legal and health and safety implications of using ICT.

INFORMATION SHEET OF SCOTLAND

INITIAL TEACHER TRAINING SYSTEM

Typology of teacher	Educational level	Model of teacher training	Duration	National standard
Pre-primary	Pre-school education centres (3-5)	It is not possible to train specifically as a nursery teacher. Nursery teachers must first obtain a Teaching Qualification.		☒ Yes ☐ No
Primary	Primary schools (5-12)	All primary teachers in training are given some experience in the pre-school education environment. It is required a Bachelor of Education (BEd) degree at one of five teacher education institutions. For those who already hold a university degree a course for a Post-Graduate Certificate in Education (PGCE), leading to a Teaching Qualification (Primary) is offered by the teacher education institutions.	4 years or degree + 1 year	☒ Yes ☐ No
Secondary	Lower secondary schools (12-16) Upper secondary (16-18)	For certain subjects a combined degree which includes subject study, study of education and school experience is required. For those who already hold a university degree a course for a Post-Graduate Certificate in Education (PGCE), leading to a Teaching Qualification (Secondary), is offered by the teacher education institutions. For teachers of technology, physical educ. or music is required a BEd degree at one of the teacher education institutions.	Degree+1 year 4 years	☒ Yes ☐ No
Vocational	Upper vocational (16-19)			☒ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

In a set of twelve core professional interests for initial training courses, the Standard document includes: "undertaking a range of approaches to facilitate the learning of pupils, including the appropriate use of ICT".

"*The Guidance on the use of ICT with Courses of Initial Teacher Education*" (1999) outlines the following five point curriculum framework for ICT in ITE in Scotland:

1. Working effectively with ICT in Teaching and Learning
2. Evaluating and selecting ICT resources
3. Monitoring, evaluating and assessing teaching and learning
4. Developing ICT capabilities
5. Technical skills and applications.

This framework should assist in planning the integration of ICT into courses of initial training.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

The term Continuing Professional Development is now used in Scotland to cover the range of in-service provision. Teachers can identify their own in-service training needs at any time. However, the process of Staff Development and Review allows teachers the opportunity to discuss their performance over the previous year with their line manager and for agreement to be reached on any additional training which may be required. In line with the guidance entitled Staff Development and Review Guidelines and Checklist, a new national framework of competencies and standards for CPD of teachers has been devised.

Under the terms of the agreement on the McCrone Committee recommendations, a total of 35 hours of CPD per annum has been introduced as a maximum for all teachers. The time is to be spent on an appropriate balance of personal professional development, attendance at nationally accredited courses, small scale school-based activities or other CPD activity.

A number of different bodies are involved in providing staff development at national, but the main bodies are the education authorities, the schools themselves and the teacher education institutions.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

ICT has the potential to improve pupils' education and to provide considerable support for teachers both in their classroom and administrative role. The Government has recognised this potential by giving high priority to developing the ICT infrastructure in schools and to training teachers in the classroom use of ICT.

The recently completed NOF (New Opportunities Fund) project provided ICT training for all serving teachers in Scotland, employing the five point ICT curriculum framework laid out in "*The Guidance on the use of ICT with Courses of Initial Teacher Education*" (1999). This guidance emphasises the importance of the effective integration of ICT within the teaching and learning environment. Thus it is not primarily concerned with the teaching of IT capability.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

Three principal types of teachers can be distinguished, depending on the education level which they teach: the teaching staff of *Educación Infantil* (Infant) and primary, that of secondary education, and that of higher education. Speaking in general terms, the teachers of *Enseñanzas de Régimen Especial* (artistic education) can be assimilated to secondary education teachers with regard to their degree requirements and professional category.

In order to teach in infant and primary education, the 1990 Constitutional Law on the General Organisation of the Education System (LOGSE) and the 2002 Constitutional Law on the Quality of Education (LOCE) require a *Maestro* certificate in the corresponding speciality, which is attained after following first cycle - 3 years - university studies. Secondary education and vocational training teachers may have taken different kinds of university degrees, so the methods used in their training vary depending on the discipline studied and the educational establishment attended. In any case, at the university teaching methods are as a whole incumbent upon university departments, and ultimately, on the teacher who provides such education.

Juana M. Sancho
Universitat de Barcelona

Professor of Educational Technology at University of Barcelona. Co-ordinator of the Quality Research Group FINT (Formación, Innovación y Nuevas Tecnologías). Co-director of the Centre for Studies of Change in Culture and Education (Parc Científic de Barcelona). Co-ordinator of the European project "*School +: more than a platform to build the school of tomorrow*".

Other contributors: Adriana Ornellas, Joan-Anton Sánchez, Silvina Casablancas (Universitat de Barcelona)

To become a secondary education teacher it is firstly required to be a *Licenciado* (Bachelor Degree) engineer or architect. Therefore, the establishments where they receive their initial training are the Faculties or *Escuelas Técnicas Superiores* or *Escuelas Politécnicas Superiores* (degree level technical colleges). In addition, it is necessary to follow a teaching qualification course, in which future teachers are trained in the pedagogical aspects of teaching in Secondary Education.

To become a Technical Teacher of Vocational Training it is necessary to hold a university *Diplomado* or Technical Architect diploma, Technical Engineer degree or equivalent for teaching purposes. These qualifications are taught in faculties, *Escuelas Técnicas Superiores* or *Escuelas Universitarias* (degree level technical colleges). They also have to complete a course for a pedagogical qualification.

As university diplomas and degrees do not include specific training for secondary education in their curriculum, those graduates wanting to become Secondary School or Vocational Training teachers have to enrol in a teaching qualification course, *Certificado de Aptitud Pedagógica* (CAP) - Teaching Proficiency Certificate, in which future teachers are trained in the pedagogical aspects of secondary education teaching. The institutions in charge of this course are the *Institutos de Ciencias de la Educación* (ICE) - Institutes of Educational Sciences. These Institutes were created by the *Ley General de Educación* - General Education Law, in 1970. They are autonomous entities under the general regulations of each university. Their main role is to provide in-service professional development for primary, secondary and vocational training teachers and initial training for secondary and vocational training teachers. In recent years they have become more and more involved in the initial and in-service professional development of university staff.

The 1990 Constitutional Law on the General Organisation of the Education System (LOGSE) designed a new system to train secondary and vocational teachers. The *Curso de Cualificación Pedagógica* (CCP) - Teaching Qualification Course - was a teaching diploma with more educational content and longer duration than the CAP that all graduates wanting to become secondary school teachers should take. The implementation of this new diploma went through multiple delays. In fact it has been put into action only in the University of La Laguna (Autonomous Community of Canaries), the University of Alcalá de Henares (Autonomous Community of Madrid) and in a few more universities in an experimental manner.

In 2004, the Ministry of Education designed a new postgraduate course for the initial training of secondary school teachers, the *Título de Especialización Didáctica* (TED) - Diploma in Teaching Specialisation - which had to last for two years after obtaining a bachelor degree. The content of this diploma, decided without achieving a minimum consensus among scholars, was highly controversial and generated a high degree of rejection. The former Ministry of Education meant to implement this new diploma in the scholastic 2004-2005. However, the new Ministry of Education, which took office after the last general elections, decided to postpone its implementation and took on the commitment of improving its content and its articulation.

In practice, therefore, and this will still be true for at least the next two years, the initial training of secondary school teachers will go on consisting of the old CAP: a course with an average of 40 hours for theoretical courses and 20 for practical work at secondary or vocational training schools.

No specific pedagogical requirement is necessary to teach in higher education. Initial training for higher education teaching staff takes place primarily in university establishments or institutions for first, second or third cycle studies alike following the perspective of learning by doing. Even if it is not compulsory, more and more Universities offer induction to teaching courses and encourage young interim staff to follow them. In many Universities more senior staff also provide the possibility to enrol in courses and apply for innovation projects in order to update their teaching skills and knowledge on the use of ICT.

Professors' and teachers' working and social conditions vary depending on the educational level at which they perform their work, as well as the public or private tenure of the educational establishment. Within the public sector, differences can also be seen between civil servants and interim personnel.

Initial teacher training: curricular framework of ICT for education

INFANT AND PRIMARY EDUCATION

The *Ley de Reforma Universitaria* (LRU) - University Reform Law - gave rise to a renewal of the existing study plans. After a considerable amount of discussion, the initial training of infant and primary education teachers was set as an intermediate degree (three years). The content of this intermediate degree, which allowed students to obtain the *Diploma de Maestro* (Infant or Primary Education Teacher), was deeply restructured. Several new courses were introduced for preparing teachers to cope better with the emerging challenges of Infant and Primary Education. A fundamental one, compulsory for students of all specialities (primary education teachers can choose among the following specialities: Generalist, Physical Education, Music Education and Languages), was "*New Technologies applied to education*". The descriptors of this course were "*Teaching Resources and New Technologies: uses in their different didactic, organisational and administrative applications. Use of the principal computing and audiovisual devices*".

The way of approaching this compulsory course varies in each University, respect to:

- The number of teaching credits per course is a minimum of 3 and a maximum of 6 (each credit stands for 10 hours of teaching plus tutorials and assignments to be completed by students).
- The proportion between theoretical and practical sessions varies from 30% to 100%.
- In some universities students have to enrol in two different courses: "Computers in Education" and "Audiovisual Communication", as their content is considered something totally independent.
- Regarding the distribution of these courses in the general training programme, some Universities take into account the need for students to have already acquired fundamental pedagogical knowledge and develop basic teaching skills; the course - or courses - is taught in the 3rd (final) year. Other Universities obliged students to enrol in these courses during the first year, neglecting these educational criteria.

We also find a great variation in the real content and the methodological approach across the Spanish University system. Nevertheless, it is possible to identify a set of common topics taught - in one way or another - to all students who become infant and primary school teachers:

- conceptual terminology of the subject matter;
- reflection about the role of media in society and school;
- didactic use of New Information and Communication Technologies;
- the need of audiovisual literacy in the teaching and learning process;
- software and hardware characteristics and their didactic use;
- media functions and their implications for schools;
- basic production of technological resources for teaching and learning;
- ways and strategies for the use of ICT and general media in teaching and learning contexts.

Students are also offered a set of optional subjects for them to be able to complete their training in this particular area, if this is their wish. The way of approaching this issue is also very different in each University. There are situations in which students are hardly offered an optional course in this field of studies and others in which they have a relatively high degree of choice.

The commonest topics for these optional courses are:

- advanced level of computers in education;
- advanced level in multimedia, audiovisual communication or social communication;
- curriculum and media, technological resources, assessment or subject-related use of pedagogical devices.

SECONDARY EDUCATION

The structure, content and methodology of the course to obtain the *Certificado de Aptitud Pedagógica* (CAP), varies considerably in each University or Institute of Educational Sciences. In general, the core curriculum consists of theoretical part and a practical part. The theoretical part contains common subject matters for all students-teachers regardless of their specialisation: General Didactics and School Management, Educational Psychology, Sociology of Education, etc.; and subject matters specific to their speciality: Teaching and Learning Methods for Mathematics, Language and Literature, Physics, Chemistry, Social Sciences, Music, etc. The practical part (Practicum) takes part in public or private secondary schools under the supervision of a secondary school teacher who acts as a tutor.

Due to the compact organisation and short duration of this course - the average time is 40 hours for the theoretical part and 20 for the practical - it is difficult to find in the syllabus any subject matter related to the use of ICT in education in particular, or

educational media in general. Nevertheless there are exceptions. The *Universidad Complutense de Madrid* and the *Universidad de Alcalá de Henares* include Educational Technology as a compulsory subject matter in the theoretical part of the core curriculum.
It is also important to point out that some Universities such as Murcia, Cáceres, Complutense de Madrid or Santiago has started to implement Internet-based activities. In most cases these activities are a complement to face-to-face teaching, but more and more students can follow the theoretical part of the course by correspondence.

General structure of the course to obtain the CAP

Theoretical Part		Practical Part (Practicum)
General Compulsory Subjects	Specific Compulsory Subjects	Practical work in Secondary School

The *Curso de Cualificación Pedagógica* (CCP) introduced fundamental changes regarding the length of the course and the curriculum. The course had to last for a whole academic year and both the theoretical and the practical parts were dramatically increased. The core curriculum also consisted in general and specific, according to the students-teachers speciality, compulsory subjects and a good amount of time spent in a secondary school.
The possibility of becoming a qualified teacher attending lessons for 12 Saturday mornings (or three evenings per week also for 12 weeks, plus spending a couple of weeks in a secondary school) seemed to have come to an end.
This course was never legislated as compulsory to become a qualified secondary education teacher and, as pointed out previously, only a few autonomous Universities asked to implement this course. In the planned curriculum of those Universities which implemented the course, only the *Universidad de Alcalá de Henares* (*Comunidad Autónoma de Madrid*), considered a 3-credit compulsory subject called "Educational Technology and Communication". The rest did not explicitly refer to this matter.
The *Título de Especialización Didáctica* (TED) - Diploma in Teaching Specialisation - allocated 6 credits (3 theoretical and 3 practical) for a subject called "Educational Research and Information and Communication Technology", with the following topics: Training teachers as researchers, Educational Research Methods, Computers in Education, Web Pages Design, Educational Computing Networks.
Taking into account that the *Curso de Cualificación Pedagógica* (CCP) has never been made compulsory and the present Ministry of Education has decided to postpone and reshape the *Título de Especialización Didáctica* (TED), for at least the two next years, in order to become a qualified secondary school teacher, Spanish graduates will only need to enrol in a sixty hours course to obtain the *Certificado de Aptitud Pedagógica* (CAP), which gives them practically no knowledge and skills in the educational use of ICT.

How initial teacher training is carried out

As stated above, Spanish Universities and institutions in charge of the initial training of infant, primary and secondary school teachers have a great degree of freedom both to decide the real content of the courses, the methodology and the delivery tools. So it is almost impossible to give a comprehensive picture of the experience of student-teachers in relation to ICT.
Spanish Universities, as the most European Universities following the Napoleonic and Humboldtian models, are still heavily based on frontal teaching. The teaching reform brought about by the *Ley de Reforma Universitaria* (at the beginning of the 80's), put a

considerable effort into making curriculum content less Platonic[1] and more functional, process and skills-oriented. One major step to ensure this objective was the obligation of making an explicit difference in every subject matter between the percentage of practical and theoretical credits. However, as in any reform, one thing is what is written on paper and another - often quite different - is what really happens, although the technical nature of ICT courses seems to guarantee a rather practical approach in teaching and learning.

As we have seen in previous sections, in the initial training of infant and primary school teachers ICT related courses offer a great degree of practicality (between 30% and 100%). However, what every lecturer understands by practical work can be rather different. What is recognised as practical work can be:

- indirect analysis of educational software or educational media. This activity does not necessarily mean the direct use of computers or other devices;
- direct analysis of educational software or educational media. This activity entails a minimum command of the basic techniques of ICT plus an understanding of the educational approach of the analysed resource;
- use of different technical devices to implement the course: virtual environments, Internet resources, media examples, etc.
- use of technical devices for students to develop their own teaching and learning materials: virtual environments, web page design, design of hypermedia resources, etc.

Courses are almost all delivered on a face-to-face basis. However, more and more lecturers adopt online virtual collaborative environments to enlarge students learning experience beyond the classroom walls. Students assignments are usually organised both on an individual and group basis. However, giving an assignment to a group does not mean that the activity can be automatically considered as collaborative.

In the case of secondary school teachers, the shortness of their training leaves very little room for more interactive teaching models. Most student-teachers hear about teaching devices, including ICT, more than familiarise themselves with them. The great majority only have the opportunity of directly dealing with ICT, if they are lucky, in the practical work. Although in the last few years, some ICEs are using ICT platforms for delivering the courses. Most learning activities assigned to these student-teachers are individual. So the team-group experience desperately needed for secondary school teachers, in the case of Spain, is not provided in the initial training.

In-service teacher training: objectives, subject areas and bodies

The 1990 Constitutional Law on the General Organisation of the Education System (LOGSE) stipulates that continuing training is both a right and an obligation for all teaching staff, who are expected to update their scientific, educational or professional expertise periodically. The Autonomous Communities are responsible for programming the pertinent activities to make such training possible, as well as for guaranteeing a wide range of cost-free courses, by fostering in-service training programmes and by the establishment of teacher training centres. In the same spirit, the 1995 Constitutional Law on Participation, Evaluation and Administration of Educational Establishments (LOPEG) recognises the necessity for updating and perfecting the professional qualifications of the teaching staff and of adapting their expertise in those areas or subject matters in which the progress of knowledge and teaching strategies call for it. Likewise recognised as noteworthy is specific training concerning the organisation and management of education establishments as well as of teaching co-ordination. The Teachers' Centres (which receive different

1. For Laurillard, "The idea of academic knowledge as an abstract Platonic form is not yet dead". Laurillard D. (1993), *Rethinking University Teaching: a frame for effective use of educational technology*, London: Routledge, p. 15.

names according to the Autonomous Community) are the foremost institutions for continuing training for non-university teachers, as well as for staff performing educational tasks in technical support services. Furthermore certain specific centres for the training of the teaching staff of vocational training have been established. These centres have been named Centres for Education, Innovation and Development of Vocational Training. The Centres constitute the basic instrument for updating and perfecting the teaching staff of vocational training, for research into the objectives and content of vocational training, and for the development of pedagogical methods and teaching means applicable to this kind of education. The Autonomous Communities, based on agreements drawn up with the Ministry of Education, Culture and Sport, likewise participate and collaborate in the activities which are organised by the Centres for Education, Innovation and Development of Vocational Training.

Teachers at private educational establishments receive in-service training through the training plans drawn up in the establishments themselves or in professional schools, corporate or trade union organisations, and other institutions. Collective bargaining agreements offer teachers certain aids and leave facilities for their training.

Further education courses attempt to adapt training plans to teaching staff concerns and the demands deriving from the 1990 Constitutional Law on the General Organisation of the Education System (LOGSE) in the following programmes.

- *Programmes intended for all teaching staff engaging in Infant, Primary and Secondary Education*, including: training projects in the educational establishments themselves; scientific and educational updating courses; action to promote the formulation and dissemination of teaching materials, as well as action addressing self-training and academic promotion for teachers (study leaves, individual aid to encourage attendance in training activities, etc.).
- *In-service training support programmes*, such as those relating to the organisation and restructuring of the continuing education network, or the qualifications of teachers in the network. Special programmes are also run in the areas of coeducation, health, drug abuse, the European Union, Spanish teachers abroad, educational counselling and psycho-pedagogical support, or support for pedagogical renovation movements and non-profit organisations engaging in teacher training.

The 2002 Constitutional Law on the Quality of Education (LOCE) states that, without detriment to the Autonomous Communities' powers, the Ministry of Education, Culture and Sport may organise continuing teacher training programmes for publicly funded school teachers at all levels and types of education. The Ministry of Education and the Autonomous Communities may collaborate in the establishment, development and implementation of teacher training programmes by means of agreements.

METHODOLOGY

The training programmes may be run under very different formats as far as methodology, contents and duration: working groups, permanent seminars, scientific and educational refresher courses, training projects in establishments, innovation projects, specialisation courses, short courses, conferences, exhibitions, round tables, lectures, etc.

Continuing education for university teaching staff is not subject to an overall plan or programme, as in the case of non-university teachers. The Universities themselves as well as various public and private institutions are responsible for updating their teaching staff's training. The framework legislation for university teaching personnel is the 2001 Organic Act on Universities (LOU). Moreover, a 1994 Order expanding on a Royal Decree (adopted in 1989 on university teaching staff emoluments) is particularly important in this context, as it establishes the procedures for evaluating research activities.

In-service teacher training: curricular framework of ICT for education

In-service teacher education is not a compulsory activity for Spanish teachers, not even in those aspects they could not possibly have been trained in when they obtained their teaching certificate (as in the case of ICT, for many of them). This means that a given teacher could go through his or her entire working life without a single refresher course or activity. Infant, secondary and vocational training teachers are only required to show they have been following professional development activities if they want to apply for an increase in their salary every six years, or for a study leave, or for promotion.

For University staff in-service professional development it is not compulsory either.

Since the mid-80s Autonomous Communities with full responsibility in educational matters started to develop Computer in Education Programmes, that were gradually converted into ICT in Education Programmes. For those Autonomous Communities without full responsibility in education the Ministry of Education established the "New Technologies of Information and Communication Programme", which ran until all educational matters were transferred to the Autonomous Communities. Since then, each of them has developed their own "ICT in Education Programme" (see the list below). The main aim of these programmes is to foster the use of ICT at infant, primary, secondary and vocational training schools. This entails both the provision of computers and full access to Internet for all public educational establishments and the training for in-service teachers.

- Averroes - Red Telemática Educativa de Andalucía: http://www.juntadeandalucia.es/averroes/
- Consejería Educación, Cultura y Deportes de Canarias: http://www.educa.rcanaria.es/
- Educarioja: http://www.educarioja.com
- Departamento de Educación de la Xunta de Galicia: http://www.edu.xunta.es/portal/index.jsp
- Departamento de Educación del Gobierno Vasco: http://www1.hezkuntza.ej-gv.net/indice_c.htm
- Educamadrid: http://www.educa.madrid.org
- Plan de Nuevas Tecnologías de la Comunidad Foral de Navarra: http://www.pnte.cfnavarra.es/pnte/index.php
- Programa Althia. Red Telemática Educativa en Castilla La Mancha: http://www.jccm.es/educacion/althia/althia.htm
- Programa de Informática de la Comunidad Valenciana: http://www.cult.gva.es/PIEVA
- Proyecto Plumier. Red telemática de Murcia: http://www.f-integra.org/plumier/plumier.swf
- WEIB - Web Educatiu de les Illes Balears: http://weib.caib.es/

Because of this decentralised political system, there is not a national plan for training of in-service teachers in ICT. The Education Department of each Autonomous Community, through its own ICT Programme, and often in collaboration with different institutions - ICEs, Teachers' Centres, Universities - designs and implements specific in-service training activities.

The way to provide in-service infant, primary, secondary and vocational training teachers' specific professional development in ICT for education is very varied indeed. Among the 17 Autonomous Communities it is possible to find those in which the main training activity consists of courses, and those which organise different training activities such as:

- Thematic workshops (up to 10 hours)
  - General view of ICT use for the different stages, cycles and subject areas of the educational system.
  - Technical aspects of the use of ICT in education (mainly addressed to ICT coordinator at school level).

- Standard courses or workshops, which can be delivered face-to-face or by Internet (between 20 and 50 hours)
  - ICT tools
    - introduction to computer-based work;
    - use of standard and office software;
    - programming languages.
  - Educational use
    - ICT for different educational stages, cycles and subject matters;
    - use of educational software;
    - design and development of ICT-based and audiovisual teaching and learning materials;
    - ICT-based school management.
- Training modules (10 to 20 hours) or standard advice to meet a given school request. Main topic:
  - basic ICT competencies.
- Standard workshops for specific groups of users: ICT coordinators, special education need teachers, rural schools. Main topic:
  - specific and periodical ICT support for these specific groups.
- Workshops or working groups to meet the request of a given group of teachers (10 to 40 hours). Main topic:
  - analysis, development and use of ICT-based teaching and learning materials.
  - innovative ICT use to improve the teaching and learning processes.
- School-based advice for the development of an innovative project developed by the whole school or a group of teachers (a whole academic year). Main topic:
  - ICT integration in different subject matters and the School Educational Plan. (In the implementation of the LOGSE, schools have to develop their own *Plan Educativo de Centro* (PEC) - School Educational Plan, in order to meet specific student needs. Some schools have taken this comprehensive plan to develop ICT-based indicatives aimed at improving the school as a whole).

Regarding higher education, over the last 10 to 15 years many Universities have provided their staff with the following possibilities

- to enrol in ICT-based courses: use of different tools (Office, Internet, Multimedia, etc.);
- to enrol in teaching and learning improvement courses in which ICT is a tool to transform pedagogical practice;
- support and advice to develop ICT-based teaching and learning materials;
- support and advice to develop and implement ICT-based innovative teaching and learning projects;
- support and advice to enlarge teaching and learning environments by using virtual platforms.

How in-service teacher training is carried out

The different Autonomous Communities, through their respective Planning Programmes for the professional development of in-service teachers offer a wide variety of training activities for infant, secondary and vocational training teachers. They normally use their portals or computer networks to give information about the range of in-service activities offered for the academic year. Some of these official portals also offer criteria-based browsing tools to help teachers in their search for training activities. The main criteria are: type of activity, content, target group, time and place, etc. These activities are mainly face-to-face, although some Autonomous Communities also offer a few mix-combining face-to-face and distance sessions, or distance courses, or workshops.

The main activities available for the professional development of in-service infant, primary, secondary and vocational training teachers are:

Courses and Workshops. These kinds of activities have the aim of updating teachers' knowledge and skills and seem to have an effect in improving their teaching. The methodological approach is extraordinarily varied. Sessions can be totally theoretical and be delivered by frontal teaching. They can also be mainly practical and follow a very instructional approach or a totally constructivist and inquiry-oriented methodology, the less likely one. These courses are increasingly being offered online.

Some Autonomous Communities have developed a set of teaching materials especially for these courses. The positive aspect of this action is that teachers have good notes to look up during and after the course. The negative aspect is often their excessively instructional flavour, as they leave few opportunities for teachers to raise questions and to transfer their learning into their daily work with students and the new training activities.

Working groups, made up of 3 to 8 - or even more - people who share a common interest for a topic easily applicable to their daily work with students. The group meets for a whole academic year on regular basis and usually achieves the objective of developing and implementing, at classroom level, ICT-based teaching and learning materials. They also produce useful reflections and conclusions regarding their work which can be highly useful for other teachers. These groups, which are self-managed, are increasingly making use of Internet for exchanging their product and enhancing their communication.

Seminars, made up of a bigger number of teachers than in the case of working groups and they include an expert that guides, advises and organises the working process. Their main aim is to develop educational research projects. The methodological process includes sharing experiences, deep theoretical debate, consultation, making up reports and occasional discussion with experts. The members of such groups are making more and more use of Internet in their working process.

School-based training projects. The main aim of this activity is to meet the training needs of the whole school staff - or a good number of teachers in the same school - during one or two academic years. The main content of this type of training is to help them to develop an ICT-based *Proyectos Educativos de Centro (PEC)* - Educational School Project, *Proyectos Curriculares* - School Curriculum Project or subject-based curriculum.

School-based improvement projects. These training modalities are aimed at fostering ICT-based curriculum development as a way of improving teaching and learning practice. They have an important educational research approach. In the best case - but also the less frequent - the whole school is involved in the project. The typical situation is that not all staff members feel involved. In this case the activity becomes similar to a working group.

Other kinds of activities, symposia, conferences, round tables, etc. They are organised by the ICT in Education Programmes, different teachers associations or by the University. They can usually be found on the Web and more and more offer Web-based access.

Teachers actual competencies and tasks in using ICT

The fact that Spain is a highly decentralised country makes it extraordinarily difficult to have surveys or studies that cover the country as a whole. In the case of the use of ICT in education, the situation is even worse.

The *Encuesta Piloto de la Sociedad de la Información y la Comunicación en los centros*

educativos - Pilot Survey of Information and Communication Society at schools - (http://www.mec.es/estadistica/SInfo.html), produced by the Spanish Ministry of Education, about non-University public and private educational centres in the academic year 2000-2001, offers the following data:

Distribution of teachers regarding their ICT knowledge

- Expert: 2.6%. Knowledge and capacity to handle their computer equipment (hardware and software); able to manage networks and/or to program computers and manage computing systems.
- Advanced: 8.7%. Deep knowledge of standard software; able to connect his or her computer with Internet and local networks.
- User: 54.2%. Able to use standard software, to navigate through Internet and to use e-mail.
- Below user level: 34.4%.

Teachers' use of ICT

- With students: 30%. Teachers that use ICT in the classroom, either in ICT subjects or in any other subject matter.
- For their own use: 46.7%. Teachers that use ICT to prepare their lessons, present content to students, etc.

The report "*Completing the Foundation for Lifelong Learning: An OECD survey of Upper Secondary Schools*" (http://www.oecd.org/document/0,2340,en_2649_34487_26302546_1_1_1_1,00.htm) produced in 2001 by the Organisation for Economic Co-operation and Development (OECD), offers the following data regarding Spain

- Student-computer ratio: 15.5. Above the OECD countries' average. Although, when the survey was realised, the Spanish Ministry of Education pointed out that this figure has substantially improved in the last year and in 2002 was already 9.4 (El País, February 4th, 2004, p. 30).
- 38% of teachers use standard software, while the OECD countries average is 47%.
- 11% of teachers use electronic mail at school, while the OECD countries average is 21%.
- 29% of teachers participate in ICT-related professional development activities, slightly below OECD countries' average which is 32%.

This survey also took into account several benchmark indicators and arranged the different countries in accordance to the following level of achievement: in highest three, above average, average, below average, in lowest three.

Spain was considered average in Staff resources, Computer resources (teacher) and Professional development (related to ICT); and in the lowest three in Computer resources (student), Professional development and Use of computers.

Problems that teachers face in using ICT in their practice

Data presented in the previous chapter can give us an idea of the kind of problems Spanish teachers are facing in using ICT in practice. The "*Encuesta Piloto de la Sociedad de la Información y la Comunicación en los centros educativos*" - Pilot Survey of Information and Communication Society at schools (http://www.mec.es/estadistica /SInfo.html) does not introduced any question regarding this issue. On the top of that, teachers are considered: experts, advanced, users or below users level, only regarding their computing abilities, not their pedagogical skills related to the use of computers in the teaching and learning project. This fact allows us to hypothesize that for years the main emphasis of Educational ICT Programmes has been in technical aspects and not in educational aspects. The most amazing case is Catalonia pioneer Autonomous

Community in promoting the use of ICT in education. According to a recent study conducted by Manuel Castells, 90% of Catalan teachers have achieved a good command of computers and use them practically every day. However, less than 20% make an educational use of these tools with their students.

The OECD survey is also a good source to understand the kind of problems teachers face in using ICT in practice. Students-computer ratio (being 15.5 or 9.4) it is always an issue brandished by principal and teacher to justify the poor use of ICT in teaching and learning processes. However, in our view, there is a much powerful indicator. According to this survey, 29% of Spanish teachers enrol in professional development related to ICT (below OECD countries average which is 32%) and in professional development Spain is in lowest three. This means that Spanish teachers have not seen the knowledge and skills updated to cope to current educational challenges. If they do not explore, study and try new methodologies and strategies; if they do not confront new ways of representing and accessing knowledge, how are they going to be ready to transform their teaching by introducing ICT - a rather foreign device for more of them?

In the "*2nd European Conference on Information Technology in Education and Citizenship. A Critical Insight*", held in 2002 (http://web.udg.es/tiec/ang/principalnegran.htm), participants identified, among others, the following source of difficulties to foster the use of ICT in the educational practice.

- The uses of ICT with a more educational potential require significant changes in:
  - the pedagogical mentality (not only of the teachers, but also of the experts, administration, politicians, families, and pupils);
  - the processes of communication, interaction and collaboration between all the actors in the educational community;
  - the way of understanding the representation of knowledge and the access to information;
  - the way of assessing learning processes;
  - the role of educational actors.
- A use of ICT that represents an improvement of education implies an additional workload for teachers, not always recognised and supported by the educational community and the administration. An innovating generalisation of these resources requires a determined institutional support.
- Those educators willing to renew and improve education with the use of ICT feel themselves trapped by administrative and organisational structures. The educational communities seem to be more ready for the change that the incorporation of ICT implies than their working conditions, current laws and budget endowments allow them to be. In this sense, some bottom up initiatives should be promoted or recognised through structures that enhance them, rather than repressing them.
- The challenges education have and will have to face in the next years refer not to the more or less comprehensive use of ICT, but to the construction of a public, plural, integrating, and equitable education system that considers the use of the tools of every period. In one of the studies conducted within the European project *School+: More than a Platform to Build the School of Tomorrow* (IST 2000, D01.1 Analysis of User's Needs) teachers, students and parents completed an on line questionnaire and give the following answers. For teachers, students and parents the main difficulties of using ICT as an educational tool were
  - equipment and access: "Lack of equipment", "Difficulty of access";
  - teachers' predisposition: "Lack of equipment, time and interest", "Lack of time, interests and resources";
  - teachers' families and administration's attitude towards new technologies: "Lack of

support from Educational Authorities and families", "Lack of interest and confidence in ICT", "Fear of new technologies", "Lack of trust";
- school organisation: "Lack of co-ordination and resources", "Difficulty to imagine a different system";
- knowledge and information: "Lack knowledge and information about how to use ICT";
- stagnation in the way of teaching: "The existing curriculum and the traditional classroom methodology does not favour learning skills".

In this same study, teachers, parents and students showed their agreement (on a Likert scaling rated on 1 to 7 - from completely disagree to completely agree) which is summarised in the following table.

	Teachers	Students	Parents
Lack of support from the Administrative bodies	4.60	4.75	5.17
Schools lack of material and human resources to introduce, support, and maintain innovations	5.51	4.88	4.70
Schools lack of autonomy to organise themselves	4.34	4.71	4.91
Teachers lack of interest for updating their professional knowledge	4.18	4.46	4.24
Teachers lack of trust in pedagogical innovations	4.28	4.44	4.62
Teachers lack of trust in technological innovations	3.79	4.65	4.13
Students reluctance to become engaged in learning activities	3.26	3.91	3.08
Parent lack of predisposition to support school's innovations	3.89	3.53	3.56

This view about the current difficulties that schools face in using ICT evidences that the main difficulties are more educational and political than technical (Castells et al. (2003), *La societat xarxa a Catalunya*, Barcelona, UOC).

Content areas involved in teachers' competencies profile in ICT for education

Content Area 1: *Critical-situational*

About the current developments of ICT, the areas of application and the impact in the socio-political and economic aspects of life, especially in all those related with professional profiles transformation (knowledge, skills, attitudes). The main aim of such training is to provide teacher with knowledge and information to guide their decisions regarding the curriculum planning and implementation.

Content Area 2: *Conceptual*

New ways to elaborate, access and represent knowledge brought about by the use of ICT and the cognitive and emotional skills entailed.

Content Area 3: *Techno-pedagogical*

Deep and wide approach to the different ICT educational possibilities. This should be implemented placing them in diverse teaching and learning approaches.

Content Area 4: *Instrumental*

Aimed to make teachers familiar with use of ICT and the most appropriate software.

Content Area 5: *Self-reflection*

Based on the analyses of their own role and the student's role in the new context.

Content Area 6: *Collaboration*

Knowledge, skills, and activity to be able to work in collaboration with other teachers, students, parents, and community members, using ICT.

INFORMATION SHEET OF SPAIN

	Typology of teacher	Educational level	Model of teacher training	Duration	National standard
INITIAL TEACHER TRAINING SYSTEM	*Pre-primary*	Pre-primary education (age 0-6)	Teaching at this level requires a *Maestro* certificate (*Diploma de Maestro*) in the corresponding speciality, which is attained after following 3-year university studies.	3 years	☒ Yes ☐ No
	Primary	Primary school (age 6-12)	Teaching at this level requires a *Maestro* certificate (*Diploma de Maestro*) in the corresponding speciality, which is attained after following 3-year university studies.	3 years	☒ Yes ☐ No
	Secondary	Compulsory secondary education, 'bachellerato' (age 12-16) Post-compulsory secondary education (age 16-18)	After having attained a Bachelor Degree, it is necessary to follow a teaching qualification course (CAP), in which future teachers are trained in the pedagogical aspects of teaching in Secondary Education.	4 years University degree + 60-hour teaching qualification course	☒ Yes ☐ No
	Vocational	Intermediate specific vocational training (16-18)	After having attained a Diploma, it is necessary to follow a Teaching Qualification Course (CAP), in which future teachers are trained in the pedagogical aspects of teaching in Secondary Education.	3 years University degree + 60-hour teaching qualification course	☒ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

As far as pre-primary and primary teachers, the curriculum of the *Diploma de Maestro* includes a compulsory course, called "New Technologies applied to education".

As a matter of fact, there is a great variation in the real content and the methodological approach of this course across the Spanish University system. Nevertheless, it is possible to identify a set of common topics taught – in one way or another - to all students who become Infant and Primary school teachers:

- Conceptual terminology of the subject matter.
- Reflection about the role of media in society and school.
- Didactic use of New Information and Communication Technologies.
- The need of audiovisual literacy in the teaching and learning process.
- Software and hardware characteristics and their didactic use.
- Media functions and their implications for schools.
- Basic production of technological resources for teaching and learning.
- Ways and strategies for the use of ICT and general media in teaching and learning contexts.

As far as secondary teachers, due to the compact organisation and short duration of the CAP course, it is difficult to find in the syllabus any subject matter related to the use of ICT in education in particular or educational media in general.

Focus of training pertaining to ICT for education

- ☐ use of applications (personnel utilities)
- ☐ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

The 1990 Constitutional Law on the General Organisation of the Education System (LOGSE) stipulates that continuing training is both a right and an obligation for all teaching staff, who are expected to update their scientific, educational or professional expertise periodically. The Autonomous Communities are responsible for programming the pertinent activities to make such training possible, as well as for guaranteeing a wide range of cost-free courses, by fostering in-service training programmes and by the establishment of teacher training centres. The Teachers' Centres (which receive different names according to the Autonomous Community) are the foremost institutions for continuing training for non-university teachers, as well as for staff performing educational tasks in technical support services.

Furthermore certain specific centres for the training of the teaching staff of Vocational Training have been established.

The 2002 Constitutional Law on the Quality of Education (LOCE) states that, without detriment to the Autonomous Communities' powers, the Ministry of Education, Culture and Sport may organise continuing teacher training programmes for publicly funded school teachers at all levels and types of education.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content

Because the Autonomous Communities have the full responsibility in educational matters, each of them has developed its own ICT in Education Programme.

The main aim of these programmes is to foster the use of ICT at Infant, Primary, Secondary and Vocational Training schools. This entails both the provision of computers and full access to Internet for all public educational establishments and the training for in-service teachers.

Because of this decentralised political system, there is not a national plan for training of in-service teachers in ICT.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

REMARK ON SWEDISH TEACHER TRAINING WITH RELEVANCE TO THE UTEACHER PROJECT

Sweden has a highly decentralised education system on all levels. Within a wide national framework decisions are taken locally. One of the consequences, is that it is hard to have knowledge about how a single teacher training college is carrying out the training programmes. That of course also goes for in-service-training which is decided in the municipalities. National initiatives exist, but participation is a local decision. Also locally initiatives for further training are developed. During 2004/2005 The National Agency for Higher Education will evaluate teacher training programmes. Initiated during Spring 2004, The Knowledge Foundation (*KK-stiftelsen*) made a survey among teacher trainees on their personal use of IT, ways of working with IT with their students and issues around IT related content in courses. The first study will be reported in December 2005 and the latter late September 2004. If these two documents (or the knowledge they will present presently) would have been available, the following sections of this report should have contained more information.

Carl Holmberg
Swedish Agency for Flexible Learning

Carl Holmberg has many years of experience of research and development work in distance education and flexible learning. Currently he is Senior Adviser in the Swedish Agency for Flexible Learning (CFL). CFL is a change agent in education systems in Sweden. He is also Chair of European Experts' Network for Education and Technology (EENet) and a Member of the Executive Committee of the European Distance and E-Learning Network (EDEN).

In a recent analysis of the Swedish IT policy and the situation at the universities and university colleges, the researchers are summing up

- there is a lack of empirical data on IT and the use of IT within higher education,
- IT is not an integrated part in strategies and plans of the institutions for higher education,
- instead of strategies, development projects are setting the agenda,
- few incentives for innovations and changes with or without IT,
- for a positive development of IT usage in tertiary education there is a demand for clear indication of the goals for education and research.

INITIAL TEACHER TRAINING

In 2001 a new, integrated teaching degree was established, replacing eight of the previous 11 teaching degrees (Child and Youth Training, Art Education, Compulsory School, Upper Secondary School, Home Economics, Physical Education, Music Education and Craft Education). The new structure means that all future teachers will have a common basic competence, combined with a chosen specialisation in particular subjects/subject areas and/or age groups. The new teaching degree comprises a program consisting of a minimum of 140 credits (equals three and a half years of full time studies) and a maximum of 220 credits, depending on the chosen area and education level.

One remarkable trait in the new programmes is that the relation to research is more emphasised. More resources to educational and pedagogical research are made available and closer links between research and the work of students. The expectations are that they should gain a more scientific approach to their future work.

The teacher-training programme will consist of three well-integrated education areas:

- a general education area, common for all students, covering key topics such as

learning, special pedagogy, socialisation, fundamental values as well as interdisciplinary subject studies (at least 60 credits);
- an education area covering the subject/subjects the future teacher intends to teach (at least 40 credits);
- an education area with a specialisation, complementing earlier acquired knowledge (at least 20 credits).

Some phases of the education involve practical activities. At least 10 credits (i.e. study weeks) in the general education area and at least 10 credits per orientation should be located at a school. To receive a teaching qualification, students should have completed independent project work of 10 credits.

The new teacher education programme emphasises the importance of special pedagogical competence enabling the teacher to be able to identify frequently recurring problem situations in the school and be able to assist pupils to get the support and help they need. All teachers, irrespective of category, will obtain in the new teacher education programme basic special pedagogical competence in the general education area. In addition, teachers will be able to deepen their knowledge by studying orientations or specialisations within a special pedagogical area.

The degree certificate shall state which orientations and specialisations a student has completed and for what teaching and purpose it is intended.

To receive a teaching qualification, students should have the knowledge and skills needed to realise the goals of the pre-school, school and adult education, and also participate in the development of activities in accordance with existing regulations and guidelines. In addition, students should be able to:

- transform good and relevant knowledge in the subject or subject areas so that pupils learn and develop,
- assess and validate pupils' learning and development and also inform and co-operate with parents or guardians,
- transmit and provide a foundation for the fundamental values of society and democracy,
- become familiar with, analyse and determine their views on general human issues, ecological condition, and changes in the surrounding world,
- appreciate the importance of gender differences in teaching situations and when presenting their material,
- independently and together with others plan, carry out, evaluate and develop teaching and other pedagogical activities and also participate in the management of these,
- make use of and systematise their own and others' experiences as well as relevant research as a basis for developing vocational activities,
- use information technology in pedagogical development and appreciate the importance of the role of the mass media in this.

In addition to this, the specific goals of the different universities and colleges apply. In many countries there are support structures or formalised mentorship for new teachers. That does not generally apply for Sweden. The headmaster in the school where a teacher is employed is responsible for that kind of introduction and support.

Initial teacher training: curricular framework of ICT for education

Schools ought to give the pupils tools to collect, work up and critically reflect upon the increasing information flow. Therefore the national framework for initial teacher training points out the importance of information technology and mass media in relation to teacher profession and schoolwork. Research on IT and learning and on the role of IT in

educational and pedagogical development should be given priority and the outcomes of research relevant to teacher training and schools should be integrated in the programmes. The new technologies should also be used in teacher education at distance.
How this is solved vary to a large extent between the institutions responsible for teacher training programmes.

How initial teacher training is carried out

Most important is the organisation of the teacher training programmes. As many of the course elements are selective for the students they can at the same time function as single subject courses for in service training.
In a five years old report a survey to 60 teacher-training students is reported. The aim of the study was to research what obligatory and selective courses containing IT related issues were present at the universities in Stockholm and Uppsala. A second problem area was to investigate how attitudes towards IT were affected of the courses.
The authors reported that the IT related obligatory parts in the teacher training programmes were very limited and not at all in compliance with the national policies. The teacher-students reactions on that were that it was insufficient and that the content was too theoretical. On the whole the students were very positive towards the use of IT in teaching and learning, but were very doubtful about the courses they had as a change factor of attitudes towards IT use.
Examples of courses given at the teacher training in Stockholm

a. Culture and communication (5 study-weeks). Basic knowledge of IT and multimedia (1 week out of the 5)
b. Computers, IT and youth (5 study-weeks)
c. Massmedia (10 study-weeks)
d. Computers as creative tools in teaching and learning (10 study-weeks)
e. CreativITy (20 study-weeks)
f. IT-communication (5 study-weeks)
g. IT as support for problem-based learning (4 study-weeks).

Examples of courses given at the teacher training in Uppsala

a) Computers as tools in school work (integrated in a longer course of 20 study-weeks)
b) To teach (20 study-weeks) IT is integrated in the whole course for presentations, students work etc.
c) Creative use of IT in teaching and learning (5 study-weeks)
d) The use of interactive multimedia in teaching and learning (5 study-weeks).

A study reported December 2003 was aiming at finding structures that supported or inhibited the integration of IT as a tool for the teacher-students learning during their education and future profession. The author surveyed 360 teacher-students and interviewed 14 teacher trainers at one of the oldest teacher training colleges in Sweden.
The use of IT in society is wide spread as was demonstrated by the study. All teacher trainers and two third of the students had own computers with fast Internet connections. The researcher did not find any systematic approaches to integrate IT in the initial teacher training. IT as a tool for the student's work and learning played a very limited role at this institution. The students used e-mail, surfed on the Internet and used word processing. According to the author that did not mean that they were knowledgeable enough to fully prosper from IT in their work and learning. One third of the students had to rely on the computers at the institution to connect to the Internet. The teacher trainers expressed a paradox in their relation to IT. On one hand they saw qualities in IT, which were against physical meetings, creating stress and constraining activities. On the other they anyhow wanted to integrate IT in their work with the students, even if they so far had not been especially successful.

A study from the same period but another university college (Malmö) is addressing teacher-students use of IT in their education. The idea in this study was to get a good picture of what type of tasks the students were working with when using IT and why they choose to do it with IT. The author identified five areas of usage, production, platforms, information search and gathering, discipline specific use and for portfolio. The 37% percent of the respondents used IT because it simplified and eased their work. Just 15% linked the usage to the national goals for IT in teacher training.

In-service teacher training: objectives, subject areas and bodies

Since 1st January 1991, the municipalities have had full responsibility as employers for teachers and under the Education Act are obliged to ensure that competence development is arranged for the teaching staff. The municipalities shall make every effort to provide competence development for school staff.

The state shall by means of the funds made available to the National Agency for Education steer activities towards nationally important areas, taking into account that it is the principal organiser of the school that has the responsibility for implementing competence development.

The authority for school development shall also contribute to ensuring that competence development becomes a part of the long-term development work of the school. The starting points for this are:

- the changed steering system for the school
- the nationally determined goal documents for the school
- the national evaluation of the school

Results from the follow-up and evaluation, the Government's and the Riksdag's policy formulations, new reforms as well as changes in the surrounding world influence the priorities of the National Agency for Education.

The municipalities have at their disposal funds set aside for competence development of their staff and they decide on its scope. The Government can set aside funds for the municipalities to support their work on developing the competence of teachers. Such a programme is currently being implemented with special funds to support the competence development of teachers in adult education.

In 1998 the Government also presented a major programme for developing the competence of teachers within the ICT area *IT in School* (ITiS). Between 1999 and 2002, more than 70,000 teachers, corresponding to half of all teachers, was offered training in using computers as a professional and pedagogical tool. The training took place in work teams. Teachers participating in the training and qualifying for an IT certificate received a modern multimedia computer in their home for work purposes.

The programme for ICT in the school, which also covered programmes for pupils, was implemented by a Delegation appointed by the Government. This was made up of representatives from the Ministry of Education and Science, the National Agency for Education and the Swedish Association of Local Authorities and the teacher unions. ITiS was completed by 31st December 2002.

In May 2002, a working group presented proposals for a new national strategy to further develop, broaden and advance knowledge and skills of ICT in the Swedish school. The working group considered that a further initiative was needed in competence development and facilitation for teachers and school heads, and also that the Swedish school computer network should be strengthened as the national resource portal in the school area. Municipalities should be provided with support in technical issue in areas covering mapping, recommendations and exchange of experience. The proposal is that

"Information competence" should become a basic skill in addition to reading, writing and counting. The proposal is currently being prepared within the Ministry of Education and Science.

Universities, university colleges, regional development centres which are currently under development are the primary organisers of competence development funded out of public money. In addition to universities and university colleges there are, however, other organisers such as educational broadcasting, the teachers' organisations and other state authorities. Municipalities purchase commissioned education from different providers, as well as private educational companies and regional development centres. There are also areas where the competence of the higher education sector is insufficient and where planning tasks have to be contracted out to institutes and organisations in order to analyse the needs for competence development and proposals for in-service measures in the long-term.

There are no overall plans or methods specifying how competence development has to be carried out. Courses, training programmes, and methods vary widely depending on who are the organiser and the purchaser.

Teachers who undergo further training often take leave of absence and are replaced by stand-ins. Otherwise further training mainly takes place during study days, evenings or holidays when pupils are not in school.

There are no all-encompassing plans or methods specifying how teaching shall be carried out. Courses, education and methods vary substantially depending on the organiser.

How in-service teacher training is carried out

As it is obvious from the information under former sections, the ways in-service training is carried out in Sweden vary between organisers.

One important general trait in the Swedish system is the following. Since the initial teacher training programmes recently were reorganised, courses for initial training can also be used in in-service training. Students in their basic teacher training have a basket of selective courses. Some of these courses have themes relating to ICT. Apart from being used in initial training already qualified teachers can follow the courses, either together with the young students if that is possible or together with colleagues if the municipally "buy" the course from the university/university-college. Those courses vary in length, normally between three study-weeks to ten weeks of study. Most common is five weeks length.

With the support of national funds during the school year 2004/2005 approximately 1,500 school leaders from 70 municipalities take part in a programme headed, *IT for school leaders*. The aim of the programme is to increase the professionalism of the head masters to initiate and realise development work integrating IT. A basis for the programme is experiential learning.

Content areas involved in teachers' competencies profile in ICT for education

0. Policy issues related to IT and schooling
1. Necessary technical skills – to get the machinery going
2. Word processing, simple programmes for administration, calculations, presentations (PPP), e-mail
3. Using search tools and the Internet
4. Importing, exporting images, texts
5. Acquaintance with and skills to use one or two platforms (WEB CT, GROOVE, etc.)
6. Production of own learning material.

INFORMATION SHEET OF SWEDEN

INITIAL TEACHER TRAINING SYSTEM

Typology of teacher	Educational level	Model of teacher training	Duration	National standard
Pre-primary	Pre-school (age 1-5) Pre-school class (age 6)	Teaching degree. In Sweden the teacher training programme combines common basic competencies for all the aspirant teachers (independently of the level, the subject, etc.) with a chosen specialisation in particular subjects/subject areas and/or age groups.	The length of the teacher training programmes vary according to the entrance qualifications of the students, the specialisations they chose (selection of courses) and the school level they will work with. That means that the study length can vary between 3 to 5,5 years.	☒ *Yes ☐ No
Primary	Compulsory school (age 7-16)	Teaching degree. (see above)		☒ *Yes ☐ No
Secondary	Upper secondary education (age 17-19)	Teaching degree. (see above)		☒ *Yes ☐ No
Vocational				☐ Yes ☐ No

* There is a national framework, but with variations through selective courses at the different universities.

Existence of teacher training courses based on ICT? ☒ Yes ■ No

ICT IN INITIAL TEACHER TRAINING

Content

The national framework for initial teacher training points out the importance of information technology and mass media in relation to teacher profession and schoolwork. Research on IT and learning and on the role of IT in educational and pedagogical development should be given priority and the outcomes of research relevant to teacher training and schools should be integrated in the programmes. The new technologies should also be used in teacher education at distance.
Nevertheless, how this is solved varies to a large extent between the institutions responsible for teacher training programmes.

Focus of training pertaining to ICT for education

- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☐ specific subject
- ☒ use in classroom
- ☐ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

The Government can set aside funds for the municipalities to support their work on developing the competence of teachers. The municipalities have full responsibility for competence development of their staff. Universities, university colleges, regional development centres, which are currently under development, are the primary organisers of competence development funded out of public money. There are no overall plans or methods specifying how competence development is to be carried out. Courses, training programmes, and methods vary widely depending on who are the organiser and the purchaser.
Courses for initial training are sometimes used in in-service training. Some of these courses have themes relating to ICT. Apart from being used in initial training already qualified teachers can follow the courses, either together with the young students if that is possible or together with colleagues if the municipally "buy" the course from the university/university-college.
Those courses vary in length, normally between three study-weeks to ten weeks of study. Most common is five weeks length.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content
In 1998 the Government presented a major programme for developing the competence of teachers within the ICT area, called "*IT in School*" (ITiS). Between 1999 and 2002, more than 70,000 teachers, corresponding to half of all teachers, was offered training in using computers as a professional and pedagogical tool. The training took place in work teams. Teachers participating in the training and qualifying for an IT certificate received a modern multimedia computer in their home for work purposes.
With the support of national funds during the school year 2004/2005 approximately 1500 school leaders from 70 municipalities take part in a programme headed, *IT for school leaders*. The aim of the programme is to increase the professionalism of the head masters to initiate and realise development work integrating IT. A basis for the programme is experiential learning.

Focus of training pertaining to ICT for education
- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☐ specific subject
- ☒ use in classroom
- ☐ practice of the teacher who operating in the knowledge society

Initial teacher training: objectives, subject areas and institutional courses

Initial teacher training courses for the various types of school are part of higher education (*Hoger Onderwijs*) some being provided at institutions of higher professional education (HBO) and some at universities. There are full-time, part-time and dual (i.e. work-study) HBO teacher training courses for primary education, special education (postgraduate course) and secondary education (leading to a grade one or grade two qualification).

PRIMARY EDUCATION

The regular way for initial teacher education for primary schools is the PABO (Pedagogic Academy for Primary Education, *Pedagogische Academie Voor Basisonderwijs*). The organisation of teacher training courses is regulated in the teaching and examination regulations drawn up by the institution concerned. There are no statutory regulations relating to the curriculum. Only the principles, structure and procedures underlying the teaching and examination regulations are prescribed by law. HBO institutions have drawn up a common curriculum covering about 70% of the total programme, but it is not compulsory by law. However, for primary school teacher training courses, there are regulations relating to the content of the examination syllabus and the exit qualifications. The competencies which primary school teachers are expected to have at the start of their careers have also been formulated and the institutions have agreed to incorporate these in their curricula. The competencies relate to subject and learning area content and dealing with pupils and other tasks. These standards of competence will in due course be laid down by law, so that institutions will be obliged to train students to meet them. The regulations relating to the examination syllabus and exit qualifications will then no longer apply. Although the government is entitled by law to lay down regulations on the organisation of courses.

Pieter Hogenbirk
Inspectorate of Education

Pieter Hogenbirk has been project manager of more than 100 projects on ICT in education. In 1997 he became process manager for integrating ICT in primary, secondary and tertiary education on behalf of the Dutch government. From 2000 on he is working as a educational inspector, with special duties in the field of ICT in education. He is vice-chair of the IFIP-Working Group on secondary education and involved in a number of Dutch, European and Unesco ICT-projects.

SECONDARY EDUCATION

The regular way for full-time initial teacher education for secondary schools is the NLO (New Teacher Education, *Nieuwe Lerarenopleiding*). A normal course lasts for four years including practical work. There are also full-time, part-time and dual university training courses leading to a grade one secondary school teaching qualification (ULO courses, *Universitaire Lerarenopleiding*). These courses are open to university students and graduates only. The organisation of teacher training courses is regulated in the teaching and examination regulations of the HBO institution or university concerned. Only the principles, structure and procedures underlying the teaching and examination regulations are prescribed by law. There are no statutory requirements relating to curriculum content. In the case of HBO courses there is a common curriculum that is used by many of the institutions. It is not however compulsory by law. The government does not lay down regulations concerning the organisation of teaching.

Since 1990, students qualify to teach one subject rather than two, as was previously the case. The courses cover both subject training and aspects of teaching in general (educational theory, teaching methods, command of language, communication, etc.). Teaching practice is an important component of every course.

QUALIFICATIONS

Grade two teachers are qualified to teach the first three years of HAVO and VWO and in all years of VMBO. Grade one teachers are qualified to teach at all levels of secondary education and in secondary vocational education (MBO, *Middelbaar Beroepsonderwijs*). In other words, unlike grade two teachers, they can also teach at pre-higher education level, i.e. the last two or three years of HAVO and VWO respectively.

Primary school teachers are qualified to teach all subjects at primary level and in special and adult education. Most teachers working at special schools have also completed the postgraduate course leading to a special education teaching qualification, though this is not compulsory.

Grade one and grade two teachers of Art, Music, handicrafts, eurhythmics, Dance, Drama, English, Frisian, minority language teaching and Gymnastics are also qualified to teach at primary level and in special education.

BACHELOR-MASTER SYSTEM

The bachelor-master system was introduced on 1st September 2002. As a result, the Dutch credit system of 42 credits a year (1 credit being equal to 40 hours of study) is being replaced by a new system designed to facilitate the comparison of courses within the EU. Under the new system, which is based on the European Credit Transfer System or ECTS, a student must obtain 60 credits a year (1 credit being equal to 28 hours of study). Existing initial courses of higher professional education (HBO) have been converted into bachelor's courses. Advanced courses offered by HBO institutions will be converted into master's courses provided they are accredited by the Netherlands Accreditation Organisation (NAO).

A slightly amended version of the *Lateral-entry Recruitment* (Primary and Secondary Education) *Interim Act* will be incorporated in the Education Professions Act. Lateral entry allows people with higher education qualifications to enter the teaching profession after passing an aptitude test. They receive training in the necessary skills.

Initial teacher training: curricular framework of ICT for education

As mentioned above, the curriculum for teacher training is the responsibility of each teacher training institute. Therefore it is up to the institute how to integrate ICT-objectives in the curriculum and also how to use ICT as a tool for learning in the programmes for initial training. However since 1999 until 2004 the Dutch government supported the teacher training institutes to change their educational setting by subsidizing plans concerning the development of nine specific innovation goals.

The third innovation objective was to integrate ICT in the educational programmes of the institutes. The sixth innovation objective was to establish a common set of standards for all teacher training institutes.

STANDARD PROFESSIONAL COMPETENCIES

As a result of the sixth innovation goal recently a framework of standard competencies for teachers has been developed, together with experts and the teacher's community. The following scheme has been set up (see table):

Compentencies	with pupils	with colleagues	within the environment	with themselves
interpersonal	taking care of a good relational atmosphere in the classroom	taking care of a coherent curriculum in co-operation with other colleagues	tuning their own actions with the people outside the school: parents, institutes	reflective and developing professionally
pedagogical	providing a safe learning environment			
subject orientated & didactical	providing a powerful learning environment			
organisational	providing an orderly and task oriented atmosphere			

Within the subject orientated and didactical competencies one of the indicators is formulated as follows:

* *The teacher chooses varied playing and learning tasks, attuned to the needs of children, using modern means, under which ICT. He/she enables different ways of working (primary education).*
* *The teacher is able to use modern educational means, under which ICT. He makes, if relevant, use of an electronic learning environment that support time and place independent learning and that supports effective communication about the learning process (secondary education).*

These are very general descriptions and they give a lot of space for individual teacher educators and teacher training institutes to offer a curriculum where these competencies (among others) are being developed. Nevertheless as these descriptions will be obligatory by law before the end of this year, they are directive for both the initial and the in-service teacher training.

INTEGRATION OF ICT INTO THE CURRICULUM

In successive reports the Dutch Inspectorate has monitored the progress of the third innovation objective in the different institutes. In those reports the term ICT-E is used. In that term all educational aspects of integrating ICT in education are included. ICT-E thus involves knowledge, skills and competencies of both teacher educators and students. In the report in 2002 the Inspectorate concludes that ICT-skills (at the level of ECDL and a more pedagogical version of that, called "DRO") have been developed quite well. Also most institutes have developed ICT-learning lines throughout the curricula, in which ICT is integrated in specific subject-related areas. There are also some initiatives to use ICT for specific subjects. However there are gaping holes with respect to the integration of ICT in the pedagogy of teacher training, to the development of a digital toolkit with an educational surplus value, and to the knowledge for integrating ICT in school didactics. Nowhere there is a clear definition of a programme relating to ICT-integration in education, i.e. 'an introduction to educational technology'. There are no readers, no textbooks, no clear entry to the world of knowledge in this area.

In the monitor in 2003 the Inspectorate concluded that a lot of progress had been made with respect to ICT. ICT and ICT-E are no longer considered as different phenomena. There are strong developments in fields with educational innovations, e.g. competency rich education, working with portfolios and flexibility of curricula.

In this monitor, five functions of ICT-E are distinguished: (1) educational functions, (2) didactical ICT-toolkit, (3) support, assessment and administrative process, (4) basic skills, (5) for knowledge and communication tools.

In all of these fields progress had been made, the technical infrastructure is in order, ICT-E is introduced via many exemplary projects. But the situation is still far away from a broad and integrated implementation of ICT-E.
In the Inspectorate publication "*ICT³ - Information and Communication Technology for Teacher Training. Pedagogic benchmarks for teacher education*", carried out by five international experts, (see http://www.onderwijsinspectie.nl/documents/pdf/ict3), five benchmarks are defined for comparing teacher training curricula with respect to ICT:

- benchmark 1 - *Personal ICT-competencies*
  handling office applications, resource tools, communication tools;
- benchmark 2 - *ICT as a mind tool*
  using ICT for co-operation between teachers, students and collaboration on pedagogical projects;
- benchmark 3 - *Educational / pedagogical use of ICT*
  using ICT in both asynchronous and synchronous learning environments;
- benchmark 4 - *ICT as a tool for teaching*
  for better teaching, planning learning activities, preparing learning materials and special ICT-subjects;
- benchmark 5 - *Social aspects of ICT use in education*
  be models of good ICT practice, realise impact ICT on society.

How initial teacher training is carried out

EXAMPLE 1: *Ichthus Hogeschool's* elementary-education teacher-training program
The Explo project of Ichthus Hogeschool's School of Education aims to train elementary-school teachers who have both vision and skill in handling ICT. Explo is a new, experimental teacher-training program. Reflecting the program's experimental nature, the name Explo stands for Exploration, particularly the exploration of new educational concepts combined with new technological possibilities.
Explo's reformed elementary education may be summarized as "adaptive education". Its realization will have several consequences for education:

1. Greater variety in program contents and teaching and learning methods.
2. Greater emphasis on instructors as stimulating and motivating creators of educational situations and on pupils as explorers.
3. Greater emphasis on monitoring the progress of individual pupils combined with accountability to parents, the competent authorities and government.
4. A more flexible organization of education combined with a multifunctional learning environment, using various teaching and learning methods and aids, including computers and the Internet.

In Explo, five uses of ICT derive from this mission. ICT serves as:

1. a link between learning-as-you-work in practice and learning-as-you-work during coursework (the Internet);
2. an aid in providing adaptive education in elementary schools in a multicultural and international context (multimedia software, the Internet);
3. a means for students to develop vision and skill in the use of ICT in education: "being digital" (a laptop as a mobile toolbox for daily use);
4. a motor for lecturers and students to be innovative colleagues in designing (digital) learning environments (the Intranet to share knowledge);
5. a hub for the exchange of knowledge (website, electronic discussion platform) and to maintain the organization's external contacts (e-mail).

The curriculum is divided into the following three phases:

1. A one-year foundation course, in which students orient themselves to the teaching profession, asking themselves as the most important question: *do I want to be and can I be an elementary-school teacher*?
2. An eighteen-month main phase offering a broadening of the various subjects and themes, the most important question now being: *what do children have to learn and how do I get them to learn it*?
3. A specialization phase, taking another eighteen months, focusing on the lower grades or the higher grades, the most important question here being: *what are my educational views and how can I implement them in an elementary school*?

The incorporation of ICT into the curriculum is based on six viewpoints:

1. To develop wide-range learning competence, students use ICT during the entire program in carrying out their learning activities with increasing command; these are the process-oriented and learning-process-oriented applications of ICT. They are closely linked with the program's concept (learning to *learn-as-you-work*).
2. To develop vision and skill in the use of ICT in elementary education, ICT for elementary education will feature in each theme term in a way fitting the theme; these are the profession-oriented applications of ICT.
3. To enhance students' practicing and processing possibilities, multimedia software is used, such as "tutorials", training programs, simulations and hypertexts. These are the new learning aids used along with traditional learning aids such as textbooks.
4. To improve the efficiency and effectiveness of (traditional) teaching and learning methods, they are supplemented with and reformed with the use of ICT, and in some cases even replaced by ICT; these are the instruction-system applications of ICT.
5. To test new possibilities, a range of facilities is available on the Intranet; these are the technical applications of ICT for students and lecturers.
6. To monitor learning and teaching, several electronic systems are available, such as the multimedia portfolio, the study-progress registration system, electronic questionnaires for the evaluation of courses and, of course, computer-supported testing systems.

EXAMPLE 2: EFA (Educational Faculty Amsterdam)

The EFA is a teacher training institute for secondary teachers. Since 1999 this institute has renewed itself fundamentally. Central issues are: more dual education (working and studying), co-operation with secondary schools, and introduction of competencies in learning. The curriculum is also renewed and made more flexible and adjustable to the individual needs of the students. In the curriculum ICT plays an important role. ICT-rich projects with students are carried out, and out of 140 practical modules 40 include the educational function of ICT. The EFA does not work with ICDL (International Computer Drivers Licence) or the didactical variant (DRO). The experience is that most students start education with enough practical ICT-skills.

Within the project assessment and portfolio the EFA has introduced three moments for assessment of the students, in which a digital portfolio is used.

In-service teacher training: objectives, subject areas and bodies

Subject matter and textbooks change continually and in-service training is therefore essential for the quality of education.

In-service training is a form of training given to members of staff in order to deepen and expand their knowledge, understanding, skills and professionalism. It is directly related to the teacher's work and builds on the basic competency acquired during initial training.

The supply of in-service training courses is determined by demand from schools. Courses

are geared to a particular target group, which may vary from an individual teacher to a small group of teachers, to all teachers in one or more types of school.
Participation in training is decided on a voluntary basis by the teachers themselves and the competent authority (school board).
In-service training is an important aspect of the integration of Information and Communication Technology (ICT) in the curriculum.
Beginning in 1993, the budget for in-service training of teachers in primary, secondary, special and vocational education has been transferred in stages from the teacher training institutes to the schools. This measure fits in with the broader policy of greater autonomy for schools. Schools themselves are now responsible for how in-service training funds are spent and are able to dictate both the actual content of courses and which institution provides the training: a teacher training institution or one of the other providers of in-service training. The teacher training institutions are adopting an increasingly market-oriented approach.
Some aspects and areas of education are regarded as so important that the Minister of Education, Culture and Science makes extra funds temporarily available for in-service training in these fields. The Minister specifies the aims of these in-service training activities and may in some cases provide schools with extra resources to allow their staff to attend the courses or subsidise in-service training institutions in order to remove any financial barriers to training. Many in-service training courses are provided by the teacher training institutions HBO (institutions and universities with teacher training departments). They are sometimes organised in co-operation with the school advisory services, one of the national educational advisory centres or experts from outside the education system. The content of courses and the choice of training institution are left to the schools to decide.
There are many different forms of in-service training. These include taught courses (theoretical instruction and/or practising of skills), independent study, conferences, placements in industry or education, further study or supervision at work. Teachers who successfully complete an in-service training course receive a certificate of attendance from the body providing the training.

In-service teacher training: curricular framework of ICT for education

The duration and frequency of in-service training courses are not prescribed. The schools decide in consultation with the training institutions how long each course should be. In-service training courses are in practice often attended outside teaching hours.
As mentioned above before, the end of this year 2004 the standard competencies for teachers will be prescribed by the government. But still the responsibility for attaining these competencies lies at the school board.
At a more detailed level there has been developed in The Netherlands the so called Digital Drivers Licence of Education (DRO). This set of objectives has been derived from the International Computer Drivers Licence (ICDL), but amplified with special educational and pedagogical objectives. For this DRO teachers can follow courses and get a diploma. By achieving this diploma a teacher meets the requirements of the standard competencies.
The first set of objectives of the DRO (1999) consisted of 7 areas of attainment targets. An English version of this concept is available in the appendix A of this report.
At this very moment the DRO exists of five modules:

1. Handling the computer
2. Word-processing

3. Information and communication
4. Processing data and presentation
5. ICT in education.

This last module consists of 81 assessment-points in 7 areas of educational application:

5.1 Personal use of ICT
5.2 Using ICT with and by children
5.3 Using ICT in the school
5.4 Didactics of ICT
5.5 Digital learning materials
5.6 ICT and organisation
5.7 Educational Digital Learning Environments.

These five modules address essentially the same objectives as the first set of DRO.

How in-service teacher training is carried out

There is a broad variety of ways in-service teacher training on ICT is carried out. Those ways match often with the stage of concern teachers are in. We mention:

General

- All kinds of information, article, specialised magazines
- Special products, CD-roms.
  In this category the Dutch Inspectorate has developed more than 80 so called ICT-portraits, written descriptions of good ICT practices in schools, subjects and with teachers.
- Informational sites
  In the Netherlands there is a special educational network (www.kennisnet.nl) for primary, secondary and vocational education with thousands of pages of information, links, learning materials, software, tools, etc. Furthermore there is the foundation ICT at school (www.ictopschool.net) which gives advise to teachers and schools concerning all aspects of ICT. On this site people can find scans to evaluate themselves or their school with respect to ICT development.
- Exhibitions
- Conferences, congresses

Specific

- Threshold courses, enthusiastic stories from other teachers
- Adoption courses, two or three afternoon sessions
- DRO-courses
- Grass-roots, small projects of individual teachers, granted by the government with a small amount of money
- Physical networks, meetings with an on-going character and exchange of experiences; also these networks are granted and subsidized by the government
- Electronic communities, also supported by Kennisnet
- Telematic on line learning sessions
- Developing projects
- On site training sessions
- Intervision.

Teachers actual competencies and tasks in using ICT

The last figures which have been gathered under the supervision of the Dutch Inspectorate date from school year 2001 - 2002. This Education Monitor was carried out by ITS/IVA.

Some of the results are showed below:

Primary education:

Usage

%	teachers	pupils
no use	8	5
starting use	40	48
advanced use	40	39
very advanced use	12	7

Skills

%	basic	pedagogical
none	7	8
some	28	31
sufficient	43	45
more than sufficient	21	16

Secondary education:

Usage

%	teachers	pupils
no use	19	5
starting use	38	35
advanced use	31	45
very advanced use	11	14

Skills

%	basic	pedagogical
none	6	25
some	21	31
sufficient	50	30
more than sufficient	23	13

Problems that teachers face in using ICT in their practice

In the same monitor there was investigated what problems teachers face with respect to the ICT infrastructure.

In primary education the following problems were identified (with percentage of teachers qualifying the problem as "big"):

1. Suitable places to set up the computers 30 %
2. Lack of finances 28 %
3. Computer connected to Internet 25 %
4. Number of multimedia computers 24 %
5. Connection from outside to the internal network 24 %
6. Bandwidth 15 %
7. Number of computers in general 13 %

Secondary education

1. Suitable places to set up the computers 30 %
2. Connection from outside to the internal network 24 %
3. Lack of finances 24 %
4. Bandwidth 20 %
5. Number of computers in general 9 %
6. Number of multimedia computers 4 %
7. Quality of computers 3 %

Content areas involved in teachers' competencies profile in ICT for education

- Role of technology in supporting innovation of education
- Digital portfolio
- Administrative applications
- National support
- Community-building
- Role of educational publishers

A detailed description is available at
http://ulearn.itd.ge.cnr.it/uteacher/national_reports.htm (The Netherlands).

Appendices

APPENDIX A – *Digital Driving Licence for Education*
Available: http://ulearn.itd.ge.cnr.it/uteacher/national_reports.htm

APPENDIX B – *ICT3 - Information and Communication Technology for Teacher training*
Available: http://ulearn.itd.ge.cnr.it/uteacher/national_reports.htm

INFORMATION SHEET OF THE NETHERLANDS

	Typology of teacher	Educational level	Model of teacher training	Duration	National standard
INITIAL TEACHER TRAINING SYSTEM	*Pre-primary*				☒ Yes ☐ No
	Primary	Primary school (age 4-12)	The regular way for initial teacher training for primary education is the 'Pedagogic Academy for Primary Education' (PABO), an Institution for Higher Professional Education.	4 years	☒ Yes ☐ No
	Secondary	HAVO: senior general secondary school (age 12-17) VWO: pre-University school (age 12-18)	Higher Professional Education teacher training courses for secondary school teachers lead to either a grade one or grade two qualification. Grade one teachers are qualified to teach at all levels of secondary education (HAVO, VWO and VMBO). Grade two teachers are qualified to teach the first three years of HAVO and VWO.	4 years	☒ Yes ☐ No
	Vocational	VMBO: pre-vocational secondary school (age 12-16)	Grade two teachers are qualified to teach VMBO.	4 years	☒ Yes ☐ No

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN INITIAL TEACHER TRAINING

Content

The curriculum for teacher training is the responsibility of each teacher training institute. Therefore it is up to the institute how to integrate ICT-objectives in the curriculum and also how to use ICT as a tool for learning in the programmes for initial training. However from 1999 until 2004 the Dutch government supported the teacher training institutes to change their educational setting by subsidizing plans concerning the development of nine specific innovation goals. The third innovation objective was to integrate ICT in the educational programmes of the institutes. The sixth innovation objective was to establish a common set of standards for all teacher training institutes.

As a result of the sixth innovation goal, recently a framework of standard competencies for teachers has been developed, together with experts and the teacher's community. The following scheme has been set up:

Competencies	***with pupils***	***with colleagues***	***within the environment***	***with themselves***
interpersonal	taking care of a good relational atmosphere in the classroom	taking care of a coherent curriculum in cooperation with other colleagues	tuning their own actions with the people outside the school: parents, institutes	reflective and developing professionally
pedagogical	providing a safe learning environment			
subject orientated & didactical	providing a powerful learning environment			
organisational	providing an orderly and task oriented atmosphere			

Within the subject orientated and didactical competencies one of the indicators is formulated as follows:

* *The teacher chooses varied playing and learning tasks, attuned to the needs of children, using modern means, under which ICT. He/she enables different ways of working (primary education).*
* *The teacher is able to use modern educational means, under which ICT. He makes, if relevant, use of an electronic learning environment that support time and place independent learning and that supports effective communication about the learning process (secondary education).*

These are very general descriptions and they give a lot of space for individual teacher educators and teacher training institutes to offer a curriculum where these competencies (among others) are being developed. Nevertheless as these descriptions will be obligatory by law before the end of this year (2004), they are directive for both the initial and the in-service teacher training.

Focus of training pertaining to ICT for education

☒ use of applications (personnel utilities)
☒ digital literacy
☒ specific subject
☒ use in classroom
☒ practice of the teacher operating in the knowledge society

IN-SERVICE TEACHER TRAINING SYSTEM

Schools are responsible for how in-service training funds are spent and are able to dictate both the actual content of courses and which institution provides the training: a teacher training institution or one of the other providers of in-service training. Many in-service training courses are provided by the teacher training institutions HBO (institutions and universities with teacher training departments). They are sometimes organised in co-operation with the school advisory services, one of the national educational advisory centres or experts from outside the education system.
Participation in training is decided on a voluntary basis by the teachers themselves and the competent authority (school board).
There are many different forms of in-service training. These include taught courses (theoretical instruction and/or practising of skills), independent study, conferences, placements in industry or education, further study or supervision at work. Teachers who successfully complete an in-service training course receive a certificate of attendance from the body providing the training.

Existence of teacher training courses based on ICT? ☒ Yes ☐ No

ICT IN IN-SERVICE TEACHER TRAINING

Content
The so called Digital Drivers Licence of Education ("DRO") has been developed in the Netherlands. This set of objectives has been derived from the International Computer Drivers Licence (ICDL), but amplified with special educational and pedagogical objectives. For this DRO teachers can follow courses and get a diploma. By achieving this diploma a teacher meets the requirements of the standard competencies.
At this very moment the DRO consists of five modules:
1. Handling the computer
2. Word-processing
3. Information and communication
4. Processing data and presentation
5. ICT in education

This last module consists of 81 assessment-points in 7 areas of educational application:
5.1 Personal use of ICT
5.2 Using ICT with and by children
5.3 Using ICT in the school
5.4 Didactics of ICT
5.5 Digital learning materials
5.6 ICT and organisation
5.7 Educational Digital Learning Environments.
As mentioned above before the end of 2004 the standard competencies for teachers will be prescribed by the government.

Focus of training pertaining to ICT for education
- ☒ use of applications (personnel utilities)
- ☒ digital literacy
- ☒ specific subject
- ☒ use in classroom
- ☐ practice of the teacher who operating in the knowledge society

Remarks

Recently a framework of standard competencies for teachers has been developed (see above); before the end of 2004 these standard competencies will be prescribed by the government.

Section 3

Week-long Seminar position papers

All participants at the UTEACHER week-long seminar in Venice were actively involved in small discussion groups, presenting overviews of the pre-service and in-service ICT provision for teachers in their country; reactions were requested regarding similarities, differences, and emergent issues. On the basis of their discussions, the groups then produced position papers which examined the key issues raised, taking into account the nature, structure and implementation of a European framework for teachers' professional profile in ICT in education.
This section contains the position papers of the three focus groups:

Group 1. **ICT and teacher training - coming to terms with change (Denmark, France, Iceland, Italy)**
Trends: Nationally-rooted conditions and trends; common trends
Mapping teachers' ICT competencies: pedagogical-didactic ICT competencies; autonomy and collaboration; ICT proficiency

Group 2. **Challenges presented by the production of a Common European Framework for ICT in Education – perspectives from the national context of Austria, Belgium, Finland, Ireland, The Netherlands and Portugal.**
Policy
Professional development
School
External parties

Group 3. **The challenge of developing a Common European Framework**
Current ITE and CPD provision in ICT for teachers (Germany, Scotland, Spain, Sweden)
Cultural and policy assumptions underlying this provision (Germany, Scotland, Spain, Sweden)
Strengths and weaknesses in this provision (Germany, Scotland, Spain, Sweden)
Challenges for a CEF(Germany, Scotland, Spain, Sweden)

We wish to thank all the participants and especially the Chairpersons and Rapporteurs, who made a valuable contribution to this joint effort.

ICT AND TEACHERS TRAINING: COMING TO TERMS WITH CHANGE

Chair
Ulla GJØRLING
Rapporteur
Jeffrey EARP
Participants
Ulla GJØRLING (Denmark)
Jeffrey EARP (Italy)
Georges Louis BARON (France)
Kristin Helga GUDMUNDSDOTTIR (Iceland)
Vittorio MIDORO (Italy)

INTRODUCTION

Changing conditions in the evolution of education systems in Europe and advances in technological development are bringing new challenges for ICT teacher training. To bring these developments into focus and gain a better understanding of their impact, we have looked closely at the implications for each of the countries in our group: the aim has been to identify those aspects that appear most significant, to detect striking similarities and differences in the different national contexts, and to trace any common trends that emerge.

In this paper we describe first the major nationally-rooted conditions and trends as identified through individual and group analysis of members' reports and presentations. Some of the aspects are unique to one country, while others are shared across borders: what emerges from our analysis and comparison is a complex picture that in part reflects the social, cultural and educational diversity present in our different countries. To get a firmer grasp of the implications, we have portrayed this picture in a concept map (see Appendix 1), which has been examined jointly with a view to tracing the common trends that emerge in all four countries.

Subsequently, as part of the process of identifying a possible common understanding of pedagogical ICT competencies for teachers, the group sought to identify possible focus areas concerning teachers' ICT competencies. The group based its work on existing national frameworks and manifestations of teachers' professional development in ICT, and incorporated the results of brainstorming sessions conducted during the seminar. On this basis we have postulated a number of competencies that we find might help form the profile of the teacher in the digital society (see Appendix 2).

1. Trends

NATIONALLY-ROOTED CONDITIONS AND TRENDS

In the case of France there is a broad prescription scheme from central authorities as regards ICT skills, but diversity and fragmentation in teacher training for ICT can be noted in the actual implementation of programs. In Italy the regional structure can lead to more responsive reaction but can also hinder national cohesion; this has implications for teacher training for ICT at national level, and at the same time intermediaries in the process can come to play a key role.

There appears to be close correspondence between the situations of Denmark and Iceland, especially regarding the importance of new methods of teachers' professional development. A remarkable feature of the Danish context is the adoption of a process-oriented approach to assessment and evaluation within ICT teacher in-service training. In Iceland distance education within teacher training (and in the broader context) has emerged out of a concrete need related to the conditions of the country but has spread to areas where distance education is not distance-driven but a conscious choice of pedagogical approach.

COMMON TRENDS

Among the four countries we identified a set of common contextual conditions:

- *In-service teacher training is continuing to fill gaps in pre-service teacher training*
  There seems to be a general tendency that initiatives of in-service teacher training in ICT are relevant not only for teachers that have been practicing for a number of years but also for the

newly graduated. In this sense in-service training is attempting to compensate for deficiencies in pre-service training. In Denmark a new project is emerging to bridge this gap. The de-facto standard of teachers' professional development in ICT is currently being put into use in pre-service training institutions. In France too projects are emerging to bridge this gap.

- *There is a tendency to take into account school level and subject area*
  In this group of countries, teachers' professional development in ICT (pre-service and in-service) focuses strongly on the different needs of teachers at different school levels and on the pedagogical potential that ICT brings to different subject areas.
- *There is a reaction against approaches that focus on ICT skills only*
  We see among the members of this group reactions against the ICT-skills-only approach to teachers' professional development, in the sense that there is a common understanding that pedagogically driven professional development is necessary to raise teachers' awareness of the merits of integrating ICT in teaching and learning.
- *Tension can be noticed between centralized and decentralized policy making, between prescription and reality*
  In two of the countries in this group we see a discrepancy between what central authorities prescribe and what is actually implemented locally or regionally. The result may be that good intentions and seemingly valid approaches expressed at the policy level may well be transformed by a variety of factors and constraints when training is implemented locally.

2. Mapping teachers' ICT competencies

It was felt that competencies, knowledge and proficiency areas are more or less subject-rooted, thus some points are more relevant for some subject clusters than for others. Similarly the points raised may be more or less school-level rooted, in the sense that, say, a primary school language teacher will require different ICT competencies than the teacher teaching physics and maths in upper secondary level. In addition to this we conclude from the national presentations that there are specificities regarding the use of ICT by teachers responsible for assisting students with special needs. The third point we want to raise is that some elements mentioned here are more relevant for in-service rather than for pre-service training.

PEDAGOGICAL-DIDACTIC ICT COMPETENCIES

The teacher is knowledgeable in the main areas of the application of ICT in schools and is familiar with the possibilities information technology offers in communication, in resource searching, and in the storing, tagging, processing and presenting of digital information: s/he can also apply this understanding in teaching and learning.

S/he explores and reflects upon the effects of new technology on culture and society, education and the children of today.

S/he is familiar with theories on ICT in teaching and learning and is able to form his own ideas about the organization of schools.

The management of digital information and the management of learning environments received special attention and we came to the conclusion that they include the following elements.

Management of digital information

- Find, use, manage and evaluate resources
- Exercise safe use of the Internet – evaluating sources
- Choose appropriate tools for the production of digital material.

Management of learning environments

- Reflect on learning processes that involve ICT
- Plan, implement and evaluate learning activities that integrate ICT
- Monitor, evaluate and assess processes, products and progress
- Reflect on school innovation in the light of ICT implementation.

AUTONOMY AND COLLABORATION

The teacher is active in collecting, assessing, evaluating, summarizing, putting into perspective and presenting information.

S/he works proficiently and in a process-oriented manner in electronic learning environments and masters different working methods with ICT.

S/he collaborates with colleagues, school management, parents and interested external parties.

ICT PROFICIENCY

The teacher is technologically competent in the sense that s/he needs to possess basic technical, technological and practical ICT skills sufficient for mastering the functionality of tools available in the local working environment.

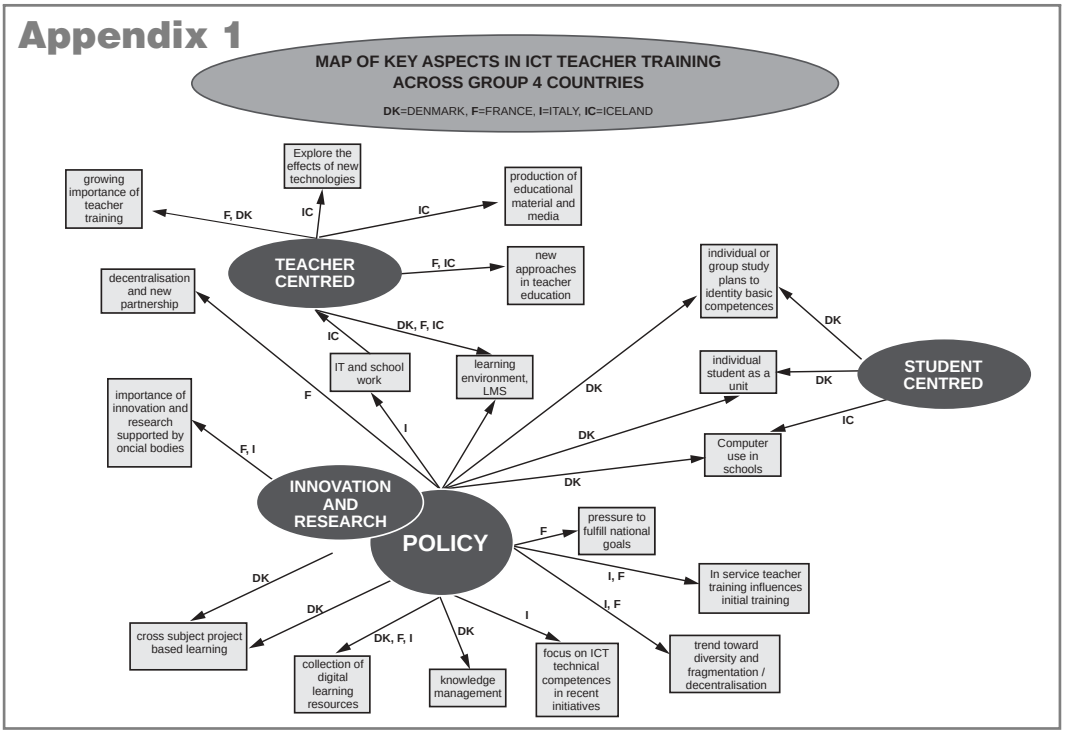
S/he is able to navigate different networks, for instance the local area network, the school Intranet, the school network, etc.

S/he has sufficient ICT skills to be able to cross over from one ICT tool to the other, and from one version of a tool to the next.

S/he uses the computer as a personal tool, as a tool to prepare lessons and as a learning tool integrated in teaching and learning situations.

S/he has a progressive attitude towards tasks and is competent in using the technology in different situations in learning and teaching.

Appendix 1



Appendix 2

POSSIBLE CLUSTERS

When addressing the need for teacher training (pre-service as well as in-service) a number of theme or subject clusters can be identified. These include the following:

Information processing

- Different uses of the Internet

- Criteria for the evaluation of websites
- The knowledge-society

Communication and collaboration tools

- Web, e-mail, information resources on the Internet
- E-conferences
- Collaboration activities on the Internet, for instance chat and communities
- Rules of Internet ethics including the use of pictures and other media downloaded from the Internet
- Videoconferencing and webcam

Text and the writing process

- Text on the computer and the application of the word processor to process, to format and to layout text

Digital images

- Digital images on the computer including use of the image-processing tool to adjust pictures, adjust light and colour.
- The application of tools for the mediation of pictures

Internal databases

- Databases-production, basic elements of a database, sort, search and queries
- The use of existing databases

Working with numbers

- Numbers on the computer, calculations, creating diagrams and modelling

Presenting digital content – multimedia and web

- Production and use of multimedia presentations
- Animations
- Production and publication of presentations
- The production of web pages and the use of basic elements text, picture, buttons, links and sound
- Awareness of the rules of intellectual property right

Using digital learning resources

- Genres of digital learning resources
- Criteria for the evaluation of digital learning resources such as websites and multimedia productions

Special needs

- Making inclusion possible
- Evaluation of software tools for students with special needs, for instance compensating or supportive tools
- Generic software put into use in special needs

Learning methods and ICT

- Learning theories about how to use ICT with children
- The application and evaluation of learning platforms both in f2f learning and in distributed, flexible learning where appropriate
- The application and evaluation of such tools as mind maps, logbooks, portfolio and collaboration tools

Evaluation and monitoring

- Assessment, screening, testing and evaluation tools
- The application of digital portfolios and logbooks

School innovation

- External demands on school development: local, regional, national
- Initiatives, resources and services available
- ICT development plans.

CHALLENGES PRESENTED BY THE PRODUCTION OF A COMMON EUROPEAN FRAMEWORK FOR ICT IN EDUCATION – PERSPECTIVES FROM THE NATIONAL CONTEXT OF AUSTRIA, BELGIUM, FINLAND, IRELAND, THE NETHERLANDS AND PORTUGAL

Chair
Pieter HOGENBIRK
Rapporteur
Conor GALVIN
Participants
Hubert EGGER (Austria)
Armand GREEFS (Belgium)
Jouni KANGASNIEMI (Finland)
Conor GALVIN (Ireland)
Pieter HOGENBIRK (The Netherlands)
Cristina NOVO (Portugal)
Stefania BOCCONI (Italy)

INTRODUCTION

The prospect of a Common European Framework (CEF) for ICT in Education received broad support from the members of this working group. From the country reports presented at the Venice seminar and the subsequent discussion, it is clear that we now face many common or similar challenges in our countries. It is also clear that we arrived where we are – in terms of education ICT policy and practice – in very different ways. A particular benefit of producing a CEF would be the reduction in overlap and unnecessary 'reinvention' that could result from our efforts singularly to move the education and ICT agenda forward. However, the task involved is a considerable one.

Our work within the seminar setting raised a considerable number of issues and points about how the CEF project might be advanced. For convenience and simplification, these points and issues are presented below under four working headings; policy, teachers' professional development, the school, and external parties. Two specific issues emerge under each heading: we should more actively follow a *learning to learn* – strategy in all the things we are doing in these four areas, and we should consistently seek to promote innovation and *change* as the lead concepts of our response to these challenging times.

1. Policy

Policy making is one thing, achieving results is another. We are entering a new phase of educational change in which more open and flexible policy is appropriate. Integration of ICT is a very long term process but we operate in a rapidly changing environment. And so, long-term planning is needed as well as the current short term expectations in order to achieve worthwhile change and 'value for money'.

We came to the following conclusions and developed a number of recommendations on the level of national and European education ICT policy:

- On both levels (European and national) people involved in ICT in education should practice a *learning to learn* – strategy. That implies planning, doing, evaluating, reflecting and rearranging or repeating but not re-inventing the wheel all the time. We need imagination and creativity in our policy thinking so that it lifts us to new possibilities.
- National policy should take advantage of European common perspectives, standards and references. To promote this there is a strong need for international co-operation, exchange of experiences, common events and collaborative and interactive projects.
- We conclude that the ICT-integration in initial training is not as developed as it is in in-service training. The framework we develop should help outline the possibilities of this integration in a better way. Or at the very least provide headings and directions under which this might be approached.
- The way governments support ICT in education should evolve from a more structured policy than it has typically done in the past, which was all right in times of facilitating

infrastructure and basic teacher training. As mentioned earlier, we are entering a new phase of educational change which demands more open and flexible policy and policy making. We believe that the politicians might set the direction of change but that realising policy as practice is the challenge faced by the educational community itself. This must be lead and supported in a manner appropriate to the setting and its requirements.

- There is a strong need for external and self-evaluation in order to support ICT-integration in education. This is not only important for ICT as such, but also because ICT can act as a catalyst for educational change in a wider sense.

2. Professional development

The professional development of teachers is particularly important within a knowledge-society. Good ICT capability forms the basis for lifelong-learning and a positive disposition towards lifelong-learning provides the basis for teachers to renew their interests and abilities in an on-going way. Our understandings of what it is to teach and to learn should be continuously adapted (up to date). *Learning to learn* should underpin much of what we do as teachers and providers of teacher education. Higher-order, general and pedagogical ICT skills can enable the teaching profession to move forward the quality and effectiveness of its work by renewing its teaching capabilities. To assist with developing this mindset, collaborative teams of practicing teachers could usefully be established in order to contribute to in-service-training. At the school and system level, ICT training should support educational institutions in developing their own ICT-strategies and in adapting new procedures and processes in support of teaching and learning.

Evaluation should accompany all these activities, but as a supportive tool not as some sort of driver of compliance or performativity. We recommend the following for discussion towards the CEF:

- We believe that teachers should be encouraged to work collaboratively in their efforts to become more ICT literate and fluent. This could involve working closely with school-based colleagues but also in larger teams that reach beyond individual subject interests and institutions. The wider perspectives this can allow also provides opportunities for different experts to contribute to the process. Schools should be encouraged and facilitated to work together in clusters. In-service teacher training should support open and distance-learning methods. Universities and colleges have an important role to play in this also: they can serve as conduits of new ideas and as 'clearing houses' for research that informs and supports the teacher in the field.
- We should not overlook the possibilities of e-learning aspects of teacher professional development in the CEF. Nor should we forget that good e-learning needs a team in the background (scriptwriters, technical support, library, course organizers, etc.). There is very considerable scope for the smart use of ICT to reach out to teachers and other educational professionals across the EU, but as yet there is little political sense of this or of coherent policy for this at the Community level. This needs addressing.
- ICT is not regularly enough regarded as a *mind tool*. We feel that ICT should be used more often in a way that engages the learner in critical thinking about the content under study. We believe that ICT usage has considerable scope for impact when considered in these terms.
- Additionally, it is wrong to see ICT simply as technology added to a teaching and learning setting and as somehow independent of the wider world and its concerns, interests and the way that world uses technology. The broader social aspects and impacts of ICT are important and must be given proper recognition within the CEF. We feel this is not just something that can be stated in a preamble to the work but rather that it must be infused throughout the document and therefore *visibly* important to those who use the framework.

- The value of useful descriptions and comparative information should not be overlooked – particularly where these are indicative rather than prescriptive – and in this regard the Portuguese model of ICT capability may be a useful starting point for further work in this area. By looking at how other countries and regions have addressed specific challenges relating to aspects of mainstreaming ICT in education, we stand to learn much. Unfortunately, there is not a strong history of such collaboration and mutuality in the way ICT has evolved to date. It will take a serious political will to change this situation.
- *Change* is at once the problem and the opportunity presented by ICT. We feel that it would be useful to include in the CEF an appreciation of this feature and to foster a better attitude towards and understanding of change management skills. ICT enables and supports changes in the way we teach: the CEF should recognise this. It also challenges a lot of deep-set assumptions that underpin the teaching act. We need to engage with this challenge in a way that draws on our creativity and criticality as professionals. Change for its own sake is of no value – change that improves what we do as teachers and how we do it is what we should be seeking.

3. School

There is an aspect of establishing ICT as a necessary element in teachers' pedagogical repertoires that needs a considerable amount of thought if we are to get it right. It concerns the role of the school in supporting and underwriting the emergence of new pedagogical praxis. We believe that the CEF could make an important contribution to clarifying this.

The school must create the best ICT-environment for the teacher that it can. Achieving this must involve the whole school community and appropriate external parties and bodies. At the level of the individual school this should comprise a developmental cycle that includes:

1. Authoring a detailed school-specific ICT plan
2. Implementing this plan as a staff and individually
3. Reflection on the progress of the plan
4. Evaluation of the progress against agreed criteria
5. Redefining and re-authoring on a continuing basis.

We fell that the following should be included as recommendations/points of action in the CEF:

- The CEF could provide an authorative starting point for developing an ICT strategy and plan for the school (similar perhaps to the practice that exists in Finland) and headings under which to pursue creatively and critically an agenda for ICT-enhanced change to its learning and teaching practices.
- The CEF should be categorical on ICT maintenance. In the past two or three decades governments across the Community put a lot of money into providing schools and other institutions of education and training with ICT-equipment, but have – in the main – now stopped doing so or reduced the level of support they give. Consequently, schools are finding problems maintaining, upgrading and replacing their hardware and software stocks. This needs thought and policy guidance.
- The use of ICT can change significantly the involvement of parents and the broader school community in the education process – both organisationally and in educational matters. A CEF needs to spell-out areas of good practice regarding the social/professional uses of ICT that teachers and other educators can adopt. These could include schools offering their experience in ICT to the parents, perhaps as courses so they can follow their children. Or facilitating and supporting work with groups in society who don't have access to ICT. The framework could also offer

direction regarding schools interaction and involvement with the working world – especially with companies, community enterprises of a local nature.
- A school has to evaluate its ICT-action and learn to improve it, to redefine the plan constantly. There is a particularly important role for a CEF in scoping-out the nature and detail of such evaluation.

4. External parties

External parties can and will play an increasingly important role in relation to ICT in our schools and in the continuing development of teachers across the EU. This is broadly to be welcomed as it often indicates the emergence of third-generation corporate social responsibility – particularly on the part of major IT sector interests and players with a pan-European interest. However, their role and influence at the policy/political level should not be allowed to dominate and distort the agenda for education ICT. We feel this is significant enough to be included in some way within the emerging CEF. This is particularly true in relation to the pressure to drive office style applications and training into the school arena.
We identified a number of issues and concerns that the framework could address concerning the possible influence of such external parties and organisations on education ICT practice:

- The CEF could acknowledge the role of the European publishing industry in putting meaningful and useful ICT resources into the education system throughout the Community. It should also suggest ways in which teachers can contribute to the development of a truly EU level movement to site education at the heart of the publishing industry's efforts by raising awareness and understanding of the school and pedagogical dimensions of their work, so that this is better represented in the publishing arena. Fostering this involvement could significantly effect the innovativeness and willingness to *change* of the educational community.
- The CEF should include mention of the benefit to teachers of being involved in developing learning networks at the local level and beyond; of being active consumers and users of the social software aspects of ICT as well as the pedagogical. Most of the teacher-targeted learning communities that currently exist with the EU are more commercial that professional in their nature and operation. It is only when teachers and other educationalists take the lead in designing, developing and sustaining such communities that their true potential is likely to be realised. And again we would emphasise the *learning to learn* basis of this.
- The CEF should acknowledge the opportunity – and the dangers – presented by the increasing presence of corporate ICT interests in the in-career training of teachers (for example, the Intel *Teach to the Future initiative*). While these programs may prove a welcome addition to the drive to raise the digital capability of teachers, they should not be seen as value free or as an alternative to a properly funded and supported, system-wide strategy. This is an area where teachers and others involved in education ICT policy making could usefully refer to a CEF for guidance and direction on useful professionalizing activity.

CLOSING COMMENT

The working group felt that the process of developing a CEF for ICT in Education should be seen in terms of *moving towards* an EU framework rather than *defining* one in some of final and fixed format. The framework needs to be concerned with higher order ICT capabilities and capacity building. It needs to be visionary and to lead by aspiration but also to be sensitive to a reality that teachers understand: the teaching and learning act within the life of a busy school.

The process of articulating such a CEF needs to be an open one and to reflect an extended and hopeful view of teacher professionalism in the use and mastery of education ICT.
We are only at the outset of a very significant challenge: the ideas we offer here are only a small contribution to an iterative process, not a conclusion. But the work is important and deserves to go forward.

References

Austria
http://elearning.vobs.at
An in-service teacher training institute working with the open source learning management system ILIAS.

http://community.schule.at/index.php?cid=1212
The Austrian pioneers in E-learning. A cluster infoboard with several communities for pioneer-schools and in-service teacher training.

http://www.virtuelleschule.at/vis05.htm,
http://www.eduhi.at/, http://e-teaching-austria.at
A Collection of e-learning content – the Austrian subject portal for teachers and schools and the so called, education highway.

Belgium
http://ond.vlaanderen.be/ict/english/
Information regarding ICT from the Flemish Government.

Finland
http://www.minedu.fi/julkaisut/koulutus/2004/opm14/tiivistelma.html
Information regarding ICT in education, training and research in Finland.

http://www.valtioneuvosto.fi/vn/liston/base.lsp?r=41389&k=en
Information about the Finnish Information Society Council.

http://www.edu.fi/koulutus/opefi/english.htm
The website contains learning materials for teachers about basic use of ICT in education.

Ireland
http://www.ncte.ie
The website of the National Centre for Technology in Education, Ireland. This is useful starting point for inquiry into the current situation of education ICT in this country and future development. NCTE also maintains the national education portal:
http://www.scoilnet.ie.

http://www.education.ie
The website of the Department of Education and Science, Ireland, contains a small amount of information on IT/ICT activity in Ireland's school system. This is the body with overall responsibility for all matters relating to ICT Strategy and Policy.

The Netherlands
http://www.lerarenweb.nl/
For an overview (only in Dutch) of the qualifications for the teaching profession as agreed upon in the Netherlands. The framework used addresses the levels of interaction for a teacher: with pupils, with other teachers, with the working environment and the reflexive level.

http://insight.eun.org/eun.org2/eun/en/Insight_School Practice/sub_area.cfm?sa=5813
ICT school portraits, compiled by national inspectorates from England, Scotland, Northern Ireland, Flanders, Austria and the Netherlands. Other Dutch reports (also in English) about schools in Scotland, Sweden, Canada, Ireland and France are available at http://www.owinsp.nl/themas/ ICTbranche/

http://194.13.31.214/publicaties/8048
ICT3 addresses the challenges of Information and Communication Technology for Teacher Training. It comprises pedagogic benchmarks for teacher education and a quick scan of promising applications in pre-service teacher training. Out of these benchmarks were developed: 1. Personal competencies, 2. ICT as a mindtool, 3. Pedagogical use, 4. ICT as 'tool for searching' and 5. Social aspects.

Portugal
http://www.dapp.min-edu.pt/nonio/
Programme Nonio Século XXI - Programme of Information and Communication Technologies in Education, was created by ministerial dispatch of the Ministry of Education dated October 4th, 1996. Following previous projects in which relevant experiences of educational usage of Information and Communication Technology (ICT) were carried out.

http://www.giase.min-edu.pt/nonio/internac/PICCTE_Profiles_Final.doc
PICTTE (Profiles in ICT for Teacher Training). This Socrates Project, financed by EC in 1999/2000, integrated 8 partners involving 3 countries: Portugal, Germany and Spain. The main objectives of the project were to build an ICT profile for teachers and an on-line course on basic ICT Competencies for teachers.

http://nonio.eses.pt
CCNS XXI. Santarém - Santaréem Competence Center of Nonio Programme, was created with others within the scope of the *Nónio XXI Century Programme* which was launched at the end of 1996, as centres promoting reflection, study and research on specific topics related to the use of the information and communication technologies and also to provide support to the preparation and development of specific projects presented by schools, encouraging the participation of lecturers and other education agents in common activities.

THE CHALLENGE OF DEVELOPING A COMMON EUROPEAN FRAMEWORK

Chair
Carl HOLMBERG
Rapporteur
Carl HOLMBERG
John DIXON
Juana SANCHO
Edwin STILLER
Participants
Monica BANZATO (Italy)
John DIXON (Scotland)
Alida FAVARETTO (Italy)
Carl HOLMBERG (Sweden)
Adriana ORNELLAS (Spain)
Manuela REPETTO (Italy)
Juana SANCHO (Spain)
Edwin STILLER (Germany)

INTRODUCTION

Any Common European Framework (CEF) will be employed only to the extent that it takes account of the diversity apparent in those countries which might use it. For a CEF in ICT for teachers, at the pre-service and in-service levels, this diversity will encompass such matters as: the degree of centralised control exerted on the education system; the degree to which formal (school) education is valued; the model of the teacher employed; the relative time invested in ITE (Initial Teacher Education) and CPD (Continuing Professional Development) programmes; the nature of the incentives offered (if any) for change, or for career development.

This problem is examined in this paper by comparing and contrasting the situations in four European countries – Germany, Scotland, Spain and Sweden.

GERMANY

Current ITE and CPD provision in ICT for teachers

In the last five years provision ICT equipment in the institutions of ITE in both phases improved very much. Most of the teacher-training centres are, as they revealed in a questioning by the Ministry of School, Youth and Children[1], well or sufficiently equipped. Nearly all institutions developed a concept of media-education, related to the official framework. Most of the teacher training centers have a representive person for ICT. The institutions very often used the support of the education-server "*learn-line*"[2]. To give an incentive for students and trainees the Ministry started the programme "*ExaMedia*"[3]. Every year there is a competition for the best written work in the first or second state examination.

Cultural and policy assumptions underlying this provision

The OECD report *Attracting, Developing and Retaining Effective Teachers. Country Note: Germany*[4] showed, that the influence of the government on the institutions of teacher education is very direct. "*According to Eurydice, the control of the school administration on initial teacher education is the strongest in Germany among all European systems*"[5]. For the teacher training centres of the second phase of ITE this control is more direct than for the universities. This top-down-process guarantees, that on the level of education programms ICT is well represented.

Strengths and weaknesses in this provision

The OECD report pointed out that "*Initial teacher education in Germany involves considerable resources and is very powerful in shaping the teaching profession. One of the strengths of this model is that it offers good opportunities for the 'user' (that is the school sector) to exercise control over its structure and content*"[6]. Another strength of the German Teacher Education system is the very close relationship between theory and praxis. There are many opportunities for students and trainees to develop concrete ICT-competences. However, it is probable that the conditions for teachers at their daily workplace[7] may hinder the use of ICT and the development of competences. Another

1. unpublished, october 2004.
2. www.learn-line.nrw.de/lehrerausbildung/medien_und_neue_medien_in_der_lehrerausbildung
3. www.examedia.nrw.de
4. http://www.oecd.org/dataoecd/32/48/33732207.pdf, september 2004
5. p.27.
6. p. 27.
7. p. 36.

weakness could be the absence of incentives to engage in ICT practise. The media portfolio in NRW is not used very often. One reason may be, that it is not integrated in the first or second state examination. In this way it is really voluntary and there are no incentives to work with it.

Challenges for a CEF

A Common European Framework must be related to the different frameworks in the 16 *Bundesländer* of Germany. In NRW the framework of the year 2000 has just been implemented in the ICT-Concepts of the universities and teacher-training centres. So a new framework will only be accepted, if there is a progression in the definition of the competences, in the description of new learning opportunities and in a better support of teacher education in ICT.

SCOTLAND

Current ITE and CPD provision in ICT for teachers

ITE programmes in Scotland are confined to the university sector where typically primary level training is by an undergraduate 4-year BEd programme and secondary training by a one-year post-graduate programme following a degree course in the relevant subject. The Scottish Executive Education Department (SEED[8]) requires that all such ITE programmes reflect their ITE Benchmark standard which, with respect to ICT, expects all ITE students to be able to demonstrate the knowledge and understanding laid out in the *SOEID Guidance on the use of ICT with Courses of Initial Teacher Education* (SOEID, 1999[9]). Thus all Scottish ITE programmes have ICT provision built into them, and this focuses principally on the pedagogical uses of ICT. In addition to this, most Scottish universities now have general programmes aimed at developing the ICT competence, or increasingly the eLiteracy competence, of all undergraduate students.

For qualified teachers in Scotland, CPD training in ICT has been provided through the NoF programme[10], which sought to bring all serving teachers up to the standard of new teachers outlined in the *SOEID Guidance* (see above). This has been followed by a national MasterClass programme in ICT[11] which aims to create an elite of pioneer users of ICT. More generally, provision is being developed in the new *Chartered Teacher programme*[12] to extend the ICT competence of long-serving teachers.

Cultural and policy assumptions underlying this provision

Although part of the UK, Scotland retains independent political control over its education system. Over the past 10 to 15 years this control has become more centralised through various SEED policies, which govern ITE, CPD, the school curriculum, and assessment practices. The underlying aim of most of these policies has been to raise the quality of educational provision throughout Scotland. These initiatives generally share a top-down view of the promotion of change, although many of the policies have been developed as a result of wide-ranging consultation procedures.

Strengths and weaknesses in this provision

Any educational system with a high degree of centralised control will possess strengths and weaknesses representing the opposite sides of the same coin. Thus, the Scottish system generally enjoys a uniformity of approach to most educational issues which derives from consensus. Schools can be sure that, irrespective of where they trained, new teachers will share a common repertoire of competences. Similarly, irrespective of where they serve, teachers can expect a common approach to the provision of CPD. It can be argued that for the teaching profession in Scotland, the existence of

8. http://www.scotland.gov.uk/About/Departments/ED
9. http://www.scotland.gov.uk/library/documents-w10/ictr-00.htm
10. http://www.ltscotland.org.uk/connected/c7NOFICTTraining.asp
11. http://www.ltscotland.org.uk/ictineducation/staffdevelopment/masterclass/index.asp
12. http://www.scotland.gov.uk/library5/education/sfct-00.asp

a common and clearly defined set of career paths, usually tied to increase in salary, is a major strength.
The other side of this coin is the very real danger that local intitiative and innovation might be stifled, and that the resultant lack of diversity in provision means there can be no Darwinian evolution of the fittest practice for any given purpose.

Challenges for a CEF

The challenge for a CEF in Scotland, as in any similar highly centralised country or region, is to find ways to infiltrate the policy making process. Without achieving this in some way there would be no chance of a CEF becoming embedded in Scottish educational practice. If the CEF appears to be aimed at an area where there is a policy vacuum then this might be relatively more easy to accomplish. But in any area where strong and established policy already exists, as is the case for ICT in education in Scotland, then this becomes a relatively more challenging task.

SPAIN

Initial Teacher Education in ICT for infant, primary and secondary teachers

Initial Education for Infant and Primary Teachers regarding ICT consists of a compulsory course on *New Technologies Applied to Education*. The way of approaching this compulsory course varies in each university.

- The number of teaching credits per course (each credit stands for 10 hours of teaching plus tutorials and assignments to be completed by students) are a minimum of 3 and a maximum of 6.
- The proportion between theoretical and practical sessions varies from 30% to 100%.
- In some universities students have to enrol in two different courses: Computers in Education and Audiovisual Communication, as their content is considered as something totally independent.
- Regarding the distribution of these courses in the general training programme, some universities take into account the need for students to have already acquired fundamental pedagogical knowledge and develop basic teaching skills and the course - or courses- is taught in the 3rd (last year). Other universities obliged students to enrol in these courses during the first year, neglecting this educational criteria.

A great variation can also be found in the real content and the methodological approach of this course across Spanish universities. Nevertheless, there is a set of common topics taught - in one or another way - to all students who become Infant and Primary school teacher.

- Conceptual terminology of the subject matter.
- Reflection about the role of media in society and school.
- Didactic use of New Information and Communication Technologies.
- The need of audiovisual literacy in the teaching and learning process.
- Software and hardware characteristics and its didactic use.
- Media functions and its implications for schools.
- Basic production of technological resources for teaching and learning.
- Ways and strategies for the use of ICT and general media in teaching and learning contexts.

In some universities students are offered a few optional subjects related to ICT. The commonest topics for these optional courses are:

- Advance level of computers in education.
- Advance level in multimedia, audiovisual communication or social communication.
- Curriculum and media, technological resources, assessment or subject related use of pedagogical devices.

Students can also get knowledgeable about the use of ICT in education in the Didactic

courses (teaching methods) related to the core infant and primary school curriculum they have to complete.

Secondary school teachers, whose initial education mainly consists of a short course (40 hour theoretical and 20 hour practical work on average), do not receive any specific education about ICT. In the best cases, they can become familiar with the educational use of ICT in the part of the course related to how to teach their subject or in the practical work at school.

Continuing Professional Development for infant, primary and secondary teachers

Continuing Professional Development in ICT is not compulsory for infant, primary and secondary teachers. When they do, they pursue it on voluntary basis, after their working time and paying the fees if the activity is not free. The CPD does not represent any reward or promotion in their carriers, although it can embody a greater degree of work or responsibility (ICT co-ordinator, etc.) which does not mean an increase in the salary or better working conditions.

CPD in ICT reaches a great degree of variety. Among the 17 Spanish Autonomous Communities it is possible to find those in which the main CPD activity consists of courses, and those which organised different actions such as

- Thematic workshops (up to 10 hours) about:
  - General view of ICT use for the different stages, cycles and subject areas of the educational system.
  - Technical aspects of the use of ICT in education (mainly addressed to ICT coordinator at school level).
- Standard Courses or workshops, which can be delivered face to face or by Internet (between 20 and 50 hours) about:
  - ICT tools
    - Introduction to computer-based work
    - Use of standard and office software
    - Programming languages
  - Educational use
    - ICT for different educational stages, cycles, and subject matters.
    - Use of educational software
    - Design and development of ICT-based and audiovisual teaching and learning materials.
  - ICT-based school management.
- Training modules (10 to 20 hours) or standard advice to meet a given school request. Main topic:
  - Basic ICT competencies.
- Standard workshops for specific groups of users: ICT coordinators, special education need teachers, rural schools. Main topic:
  - Specific and periodical ICT support for these specific groups.
- Workshops or working groups to meet the request of a given group of teachers (10 to 40 hours). Main topic:
  - Analyses, development ad use of ICT-based teaching and learning materials.
  - Innovative ICT use to improve the teaching and learning processes.
- School-based innovative projects developed by the whole school or a group of teachers (a whole scholastic year). Main topic:
  - ICT integration in different subject matters and the School Educational Plan (the implementation of the LOGSE, schools have to develop their own *Plan Educativo de Centro* (PEC) - School Educational Plan - in order to meet specific students need. Some schools have taken this comprehensive plan to developed ICT-based indications aimed to improve the school as a whole).

Cultural and policy assumptions underlying this provision

ICT is considered as just another teaching devise to be used (or not) to deliver current school curriculum. In infant and primary education where everybody seems to see the need for teachers to use different kind of devices to wide students' experience, ICT is considered a compulsory subject through which future teachers should get familiar with the functional aspects of this emerging tools. In secondary education, where still is held the prevalent view that teachers should *teach their subject*, more than *helping subjects to learn*, the role of ICT in the teaching and learning process is not clearly seen.

The nature of the current school curriculum, rather fragmented into a set of overload subjects, makes difficult to figure out more integrated and inquiry oriented teaching and learning situation, where ICT has a crucial role. This state of affaires helps to understand the kind of CPD activities offered by different entities.

The lack of a career framework for teachers makes it impossible to relate CPD to any professional promotion or award.

Strengths and weaknesses in this provision

The strengths of this provision are hardly seen. ITE and CPD in ICT, in tune with the current school curriculum, is fragmented, technically oriented, and fails to give teachers a holistic view of today's kids and teenagers' educational challenges and needs. The way ITE and CPD in ICT is implemented helps to maintain the belief that educational aims, content, methods, assessment and tools can be set separately and that the consideration (or not) of a new teaching tool can be done without rethinking the nature and mission of education, the way knowledge is represented, the established power relationships, the interaction among students, teacher, parents and communities (in and out school time and space), and the role of assessment in the teaching and learning process. Failing to see school education as a holistic issue leads to fragment and technically orient ITE and CPD in ICT, which are unuseful for teachers and for the considerable challenges they daily face.

Challenges Common European Framework (CEF)

The main challenges for a CEF are deeply related to the main weaknesses of existing ITE and CPD in ICT in Spain. A CEF should be able to consider the educational process as a whole and manage to not break into such parts as educational aims, content, methods, assessment and tools. It should be a powerful device for helping policymakers, teacher educators, school leaders, teachers and even parents to rethink the nature and mission of education in the present and near future society.

SWEDEN

Current ITE and CPD provision in ICT for teachers

ITE takes place at the universities and is a programme of a minimum of 140 credits (equals three and a half years of full time studies) and a maximum of 220 credits (five and a half years). The length depends on the chosen area and education level. Common for all students (at least 60 credits) a general education area (Learning, Special Pedagogy, Socialisation, Fundamental Values), an area covering the subject/subjects the future teacher intends to teach (at least 40 credits) and a specialisation (at least 20 credits) complementing earlier acquired knowledge. All teachers will thus have a common basic competence, combined with a chosen specialisation in particular subjects/subject areas and/or age groups. Links between research and the work of the students are expected to result in a more scientific approach to their future work. Some phases of the education involve practical activities. At least 10 credits (i.e. study weeks) in the general education area and at least 10 credits per orientation should be located at a school. To receive a teaching qualification, students should have completed independent project work of 10 credits.

There is a wide national framework of aims to keep in mind when the ITE is realised. How the programme is carried out at the different universities is up to local decisions. Concerning ICT, the framework states that students should be able to use information technology in pedagogical development and appreciate the importance of the role of the mass media in this. Thus students have a basket of selective courses. Some of these courses have themes relating to ICT.

The municipalities as employers for teachers have full responsibility for CPD. As many of the course elements in the ITE are selective for the students, they can at the same time function as single subject courses for in service training. The municipalities purchase such courses from the universities, as well as non-credit courses from private educational companies and regional development centres. Teacher's workload is counted on a yearly base; 1360 hours should be used for pedagogical work at school and out of that at least 104 hours for CPD.

National initiatives exist, e.g. in 1998 the Government presented a programme for developing teacher competence – ICT in school, ITiS. Between 1999 and 2002, more than 70,000 teachers, corresponding to half of all teachers, was offered training in using computers as a professional and pedagogical tool. The training took place in work teams. Teachers participating in the training and qualifying for an IT certificate received a modern multimedia computer in their home for work purposes.

Cultural and policy assumptions underlying this provision

The education systems in Sweden are highly decentralised. National plans exist but give just a wide framework for further development of goals and curriculum locally. It is therefore complicated to describe both initial training and further competence development of teachers as it can to a large extent vary. It varies between the universities offering initial training and between the municipalities, which as employers of the teachers cater for their competence development.

The focus from the national level has been more on the organisational set up rather than giving the actors a closed set of aims or very strict programmes. In May 2002, a working group presented proposals for a new national strategy to further develop, broaden and advance knowledge and skills of ICT in the Swedish school. In brief the proposal is that "Information competence" should become a basic skill in addition to reading, writing and counting. The proposal is currently being prepared within the Ministry of Education and Science.

Strengths and weaknesses in this provision

It is quite clear from this short summary on Sweden the situation gives much room for bottom-up strategies. If the visions and goals are shared for a school system transformed towards increased flexibility and learner orientation (realised with the integration of ICT) that is a very important asset. A crucial aspect of the same is thus the uptake of European and Swedish policy at school, municipality and university levels. If the policy is not adopted on the different levels little development will happen.

In a decentralised system like the Swedish one decisions on buildings and organisational issues are taken locally. One important aspect of that is that salaries are decided *per individual*, which means that increased salary could be used as an incentive for teachers ICT related improvements.

Challenges for a CEF

In the Swedish case any CEF must be understood and meet the needs and demands of the individual teachers, headmasters, local school politicians in the municipalities and the politicians at national levels as they are all involved in policy and decision making in the education systems.

CONCLUSION

A CEF which might find utility in countries as diverse as these must have the following features:

- Cultural and policy contexts vary to a large extent between countries. As a consequence of that the CEF must avoid normative statements and be adaptable to different contexts.
- Contextual variation also exists in the infrastructure of the different countries. What is already achieved in one country due to the presence of technological infrastructure could be out of reach in an other due to lack of investments in technology.
- To be suitable for diverse policy contexts any CEF must have a judicious mixture of more general higher-order aims or purposes, and the offer of more specific, concrete outcomes which may be taken up where needed. It should avoid narrow definitions of technical competences, which most of the time end up being the reformulation of old behavioural objectives, and look for more holistic views of educational know-how that clearly embodies present and near-future educational needs and challenges in a society increasingly mediated by ICT.

Published in
January 2005 by
MENABÒ s.r.l.
Via F.P. Cespa 102
66026 Ortona/Italy
tel. +39 085 9062001

Managing editor
Gaetano Basti

Graphic design & paging
MobyDick, Ortona/Italy

Printed by
Litografia Botolini s.r.l.
Rocca San Giovanni/Italy

ISBN 88-86396-70-8