ANALYSING DIGITAL LITERACY FRAMEWORKS.

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ANALYSING DIGITAL LITERACY FRAMEWORKS

ANNEXES

by

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PRESENTATION

This paper presents the description of ten frameworks for ICT and Education. These frameworks have been selected as representative of the different policies and strategies deployed by governments from the turn of the century to 2006 to address the digital literacy educational challenge. The presentation focuses on the characteristics of each framework. A comparative analysis of these frameworks is available in the accompanying document.

The following ten "frameworks" are presented in this document:

1) Raising the Standards. A proposal for the Development of an ICT Competency Framework for Teachers, Australia (2001).

2) Digital Transformation. A Framework for ICT Literacy, in the U.S.A (2002).

3) ICT in Teacher Education. A Planning Guide. A Curriculum for Schools and Programme of Teacher Development. UNESCO (2002).

4) Digital Competence: from ICT skills to digital "bildung", in Norway (2003)

5) I-Curriculum: The knowledge and Information Skills needed for Living in the Digital Age. Minerva Action implemented in Greece, Spain and UK (2004).

6) European Pedagogical ICT Licence in Denmark (1999-2006).

7) AUSPICT The Pedagogical ICT Licence in Australia (2005).

8) Common European Framework for Teachers' Professional profile in ICT for Education (2005). uTeacher project outcome (eLearning Initiative and Action Plan)

9) TICE (Technologies de l'Information et de la Communication pour l'Éducation) Framework in France (2002-2006).

10) Technopedagogical competence referential for teachers. (Référentiel de competences technopédagogiques pour le personnel enseignant.) Québec, Canada (2006).

A specific presentation of each "framework" is provided through some or all of the following entry items:

Introductory information

1. Context, scope and intended audience of the framework

2. Visions and objectives: What is the rationale fo the methodology? What are its aims and intentions?

3. Basic components of the digital educational practices

4. Strategies

5. Evaluation of the framework: what has been planned, realised?

6. Further reading for an augmented understanding.

Introductory information:

The ICT Competency Framework for Teachers is the final report of a three-step national project which took place in Australia in 2001 and which is focused on producing standards for ICT in teaching and learning. The first step was a literature review summarizing current research in learning with ICT and mapping work on teacher ICT performance measures. The results were gathered in a document comprising three sections: two sections which map teacher professional standards developments in Australia and overseas; and the third section, which analyses the significant issues relevant to ICT competence in teaching and learning. This document was discussed at a two-day national workshop of key stakeholders (60-70). The third phase was "an analysis of the main findings of the Literature Review and Mapping document, discussions at the forum and the generation of a draft ICT Competency Framework proposal." A final report in web-ready format summarised the project work and presented proposals for a teacher ICT Competency Framework and for ways the work could be supported and shared at a national level. It is this last framework proposal that has been analysed here.

Raising the Standards. A Proposal for the Development of an ICT Competency Framework for Teachers. A project undertaken by UWS, ACSA, ACCE and TEFA on behalf of the Commonwealth Department of Education, Science and Training, Canberra, Australia. http://www.dest.gov.au/sectors/school_education/publications_resources/other_publications/raising_the_standards.htm Raising the Standards, PDF Document (242.24 KB, 44 pages) Appendices PDF Document (393.94 KB, 92 pages) (Accessed May 28th 2006).

1) Context, scope and intended audience of the framework

"Raising the Standards", the first, chronologically speaking, framework considered in this study, presents the unique characteristic of encapsulating "the integration of two policy agendas within school education"[1]: ICT specific teacher standards and the general "standards/accountability" movement within the school education sector. Furthermore, this framework, elaborated in 2001, is only one of "a number of significant national and local initiatives related to developing and supporting effective ICT use in school education" that were being developed at that time in Australia. It builds more specifically on *Learning in an Online World: The School Education Action Plan for the Information Economy* (Commonwealth of Australia, 1999) and answers teacher competence needs addressed in the *National Goals for School in the Twenty-First Century* (DETYA, 1999). The need identified for ICT competent teachers "stems from the need for ICT competent students and for ICT-rich learning environments that enhance students' learning across the curriculum."

These actions plans were presented as a response to face the industry and commerce's pressure on the Australian society to adopt Information Communication Technology in a major way. The rationale presented states that there's a gap between the workforce in the country and the industry and commerce's needs which must be covered by specific competencies acquired by the citizens, competencies that will enable the actual professionals and a "latent workforce" to function in the information society. The 2002 framework itself is aimed at the educational system, and even if the central actor is the

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[1] Unless specifically referenced, all quotations are from the framework reports.

teacher, the plan defines "the teacher in regards to the students' development." The purpose is to help the educational sector overcome apparent lagging behind. As stated in the Executive Summary, "The need to better exploit the teaching and learning potential of ICT is widely accepted and supported. However, to date, this potential has not been realised in any significant way, particularly the potential to transform how, what, where and why students learn what they do. While there are only limited examples of the transformative power in the educational sector, experience from industry and other sectors clearly demonstrates that new times need new approaches, and that the nature and application of ICT enable that transformation. »

The framework is aimed basically at different categories of teachers: beginning teachers, teachers beginning to use, accomplished teachers, school leaders and teacher educators. But its intended audience also includes actors working with teachers, such as students, teacher employers/school systems, teacher education institutions and the community at large. The importance of context is stressed with the recommendation to place teaching standards "in teaching and learning contexts that are meaningful and relevant to the key groups". Teachers should be able to relate them to their current practice and identify and plan pathways according to their different levels of competence.

In the *Raising the standards* proposed framework, competence is defined as "the ability to combine and apply relevant attributes to particular tasks in particular contexts. These attributes include high levels of knowledge, values, skill, personal dispositions, sensitivities and capabilities, and the ability to put those combinations into practice in an appropriate way". The framework stresses "the need to develop a broader understanding of the potential of ICTs to transform the very nature of schooling in terms of structure, process and content". This is the strong imperative for developing ICT competence in teachers, but also to develop « ICT literate students » as critical consumers of ICT with a » critical understanding of the roles ICT plays in our society ». As strongly stated, « A major driving force behind the development and implementation of a teacher ICT Competency Framework is to improve the levels of student ICT competence and student learning outcomes. » The framework therefore advocates the development of teacher ICT standards for the use of ICT in the curriculum, based on an impressive "Literature Review and Mapping" document. By ICT standard is meant "a combination of attributes underlying a particular aspect of successful teacher professional performance involving the use of ICT".

2) Visions and objectives: What is the rationale of the methodology? What are its aims and intentions?

This framework proposal outlines a range of objectives and associated strategies to achieve" the potential of ICT to transform how, what, where and why students learn what they do". The objectives are based on the transformative power observed in industry and other sectors where it is clearly demonstrated that "new times need new approaches, and that the nature and application of ICT enable that transformation". Substantiating evidence of the potential of ICT to enhance learning environments and improve students' learning outcomes in both cognitive and non-cognitive domains was being produced and stakeholders were intent on fostering the use of these advantageous tools.

The framework articulates teacher professional standards in general and ICT Competency standards. It is based on what constitutes effective pedagogy and the effective use of ICT in schools. Some of the underlying assumptions are that "an ICT Competency Framework will

♦ acknowledge the notion that teachers need time and support to develop competence;
♦ assist teachers to uncover their personal beliefs about teaching and learning;
♦ encourage teachers to describe their experiences with ICTs and the assumptions they have about ICTs;

♦ assist teachers to make the necessary curriculum links to effectively integrate ICT use in their classroom practice;

♦ enable teachers to assess their level of ICT competence and develop pathways to improve that competence;

♦ address social justice issues such as access to professional development, access to appropriate resources, geographic isolation and ethnicity;

♦ be supported simultaneously by a range of complementary initiatives including institutional

♦ capabilities, technological capacity, infrastructural capacity and policy support;

♦ allow for the development of standards based on a sound understanding of the complex nature of teachers' work;

♦ support the concept of learning communities that share ideas and experience;

♦ link to, and provide a focus for, life-long learning as part of a teacher's ongoing professional development;

♦ be consistent with student ICT standards. (…)"

This project is of great interest, among other aspects, because it focussed on the development of a framework proposal that could be used by teacher education institutions, teacher employers and professional associations to develop ICT standards relevant to their purposes and contexts, based on the transformative power of ICT.

As it will become more and more evident, the transformative power of ICT does not translate directly into improved academic outcomes. Innovation, change and improvement can result when teachers and institutions integrate ICT, if they use different strategies and adapted assessment measures 1) to influence student academic performance, or 2) to develop higher order thinking and problem solving, or 3) to improve student motivation, attitude, and interest in learning, or 4) to help to prepare students for the workforce; or 5) to address the needs of low performing, at-risk, and learning handicapped students[2].

3) Basic components of the digital educational practices:

♦ **Is there a "learning process model", or "learning paradigm" which support the framework?**

Rather than a specific learning theory, the framework is based on standards that describe in assessable terms the specific characteristics of an effective schoolteacher or school leader. The ICT competence standards are embedded in existing teaching standards that can be summarised as follows. "An effective teacher with professional expertise

♦ has a commitment to students and their learning;

♦ has a deep knowledge and understanding of their subject discipline and of effective pedagogy;

♦ implements effective monitoring, assessment and reporting of student progress;

♦ has a commitment to reflect critically on their own practice and to ongoing professional development; and

♦ participates in, and contributes to, the whole educational community at a range of levels and addresses all the dimensions of ICT use in teaching and learning."

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[2] As most researches have shown general improvement results are almost impossible to substantiate in the pedagogical use of ICT. These five dimensions, used by CARET, the Centre for Applied Research in Educational Technology, present an advantageous approach that allows measurable evaluations and comparisons. http://caret.iste.org/index.cfm?fuseaction=questions&topicID=1 (Accessed May 29th, 2006).

Standards for effective school leaders are also based on high levels of skill and knowledge in the areas of leadership and management. An effective school leader

♦ ensures that the learning of students in the school is optimal;
♦ has vision, develops cooperatively a common purpose, is creative and inspiring inn their interactions with others,…
♦ has an understanding of cultural values and the role of education in Australia today;
♦ undertakes consistent, systematic and critical review and reflection on all aspects of practice. (…)

A best practice approach is fostered through the provision of access "to a comprehensive collection of exemplars of practice". The recommendation stresses the need for a set of exemplars as comprehensive as possible so that educators from all levels of schooling and for all areas of the curriculum can "connect" to them and draw from them to improve their practice. The framework report also includes the suggestion to draw "on the experiences of previous projects involved with the identification and publication of exemplary ICT practice" and to put in place an ongoing process so that the collection does not remain static but continues to evolve.

♦ What is meant by "digital literacy"? or ICT literacy, media literacy, information literacy, e-literacy?

Since the reports were elaborated in 2001, they do not address "digital literacy" or other literacies as such, and the framing of ICT issues is more in terms of use than of literacy. It refers however to the report "Learning in an online world" (Commonwealth of Australia, 1999), which acknowledges that "young people are entering a complex society, where current and emerging technologies provide expanding opportunities for learning and for engaging in local and global issues". Students need to become proficient in the use of these technologies and it is school education that provides "the foundation for the knowledge society and for the development of citizens who are creative, confident ad enterprising."

Five interrelated key action areas are specified for empowering school education: people, infrastructure, content and services, supporting policies and enabling regulation. All students are expected to develop the required skills and attitudes needed in the information economy and all teachers to become competent users of IC technologies and all educational leaders "to lead and manage the changes required to maximise the benefits of these technologies in school education".

Four dimensions of ICT use are addressed in the framework and correspond to four different levels of integration of ICT in education. The following table explains "the relationship between the dimensions of ICT use in teaching and learning, the stages of development of ICT competence and how this relates to the five identified key groups".

Dimensions of ICT Use	Stages of ICT Competence	Key Groups
ICT as a tool for use across the curriculum or in separate subjects where the emphasis is on the development of skills, knowledge, processes and attitudes related to ICTs.	Minimum	Underpins all teaching practice.
ICT as a tool for learning to enhance students' abilities to deal with the existing curriculum and existing learning processes.	Developmental	For pre-service/beginning teachers.
ICT as an integral component of broader curricular reforms that change not only how students learn but also what they learn.	Innovator	For practicing teachers who are beginning users of ICT and for accomplished/highly accomplished users of ICT.

ICT as an integral component of the reforms that alter the organisation and structure of schooling itself.	Leader	For highly accomplished users of ICT and for school leaders and teacher educators.

4) Strategies. How is the framework to be implemented?

The framework is to be implemented through a multi-dimensional approach. The conditions that need to be present for a successful implementation of the use of ICT in schools are referred to as supporting capabilities. Both professional development and performance management standards for teachers need to be developed. Therefore the supporting capabilities will come from the teacher education institutions, such as leadership and vision in the use of ICT, and from the schools/school systems, such as policies and standards supporting new learning environments.

These can be summarised in three overarching strategies that are:

- "strengthen programs for schools to adopt new paradigms of learning using ICT,

- commit resources to the three key areas of professional development, infrastructure and curriculum content in a balanced and integrated way,

- undertake and disseminate research related to the inks between the use of ICT and learning objectives".

5) Evaluation of the framework: what has been planned, realised?

Provision has been made for an evaluation process to ensure that the framework is kept up-to-date and relevant. "A three-year review process should draw on data from users of the framework, standards development and implementation and feedback from teacher assessment undertaken as part of the implementation of any standards developed from the framework. The review process should be conducted at a national level by an independent body."

A performance measurement and reporting Taskforce presents on the website of MCEETYA (2005), the Ministerial Council on Education, Employment, Training and Youth Affairs, a national assessment program that was to take place in 2005. ICT literacy is the main focus as an essential skill across all learning areas, for all students, reflects the wide prevalence and use of ICT in society and the value of ICT literate citizens. As ICT changes it is increasingly important that these skills are adaptive and transferable and are used as a tool to assist and transform learning in conjunction with other essential skills, such as literacy, numeracy and problem solving.

ICT literacy is defined as "*the ability of individuals to use ICT appropriately to access, manage and evaluate information, develop new understandings, and communicate with others in order to participate effectively in society ».* Here ICT literacy converges on technical skills but also involves assessment of information gathering and the development of new understandings and communication. The different processes are clustered into three strands: working with information, creating and sharing information and using ICT responsibly. The organisation of the ICT literacy domain into three strands is intended to assist with the development of assessment tasks and the subsequent interpretation of student responses to the assessment tasks, with one key performance measure in each priority area. An ICT literacy progress map (see Appendix 1, page 9) has also been developed, with cumulative descriptions at each of the six levels of increasing complexity and sophistication in using ICT. The assessment itself will consist of tasks administered through a computer environment. "Students will attempt a general skills module and several thematically linked assessment modules." Sample items are provided in the assessment program paper.

Unfortunately no concluding information on the implementation of this framework has

been found on the government websites. This does not mean that there has been no follow up, s there is extensive reporting of education activities on the websites.

6) Further reading for an augmented understanding:

Commonwealth of Australia, (1999), Learning in an Online World: The School Education Action Plan for the Information Economy http://www.edna.edu.au/file12665 (Accessed May 29th, 2006).

Cuban, Larry, (2000), "The Technology puzzle, Why is Greater Access Not Translating Into Better Classroom Use", *Education Week*, vol. XVIII, N° 43, August 4, 1999.

Department of Education, Training and Youth Affairs (DETYA, 1999) *National Goals for School in the Twenty-First Century.* http://www.dest.gov.au/sectors/school_education/policy_initiatives_reviews/national_goals_for_schooling_in_the_twenty_first_century.htm (Accessed May 29th, 2006)

Framework for the Future Steering Committee. (2003) *Enabling our future: a framework for the information and communications technology industry.* Canberra: Commonwealth Department of Communications, Information Technology and the Arts. (Accessed May 29th, 2006) http://www.dcita.gov.au/download/0,6183,4_114033,00.rtf.

Performance Measurement and Reporting Taskforce (PMRT). (June, 2002) *A measurement framework for national key performance measures.* Melbourne: Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA).

MCEETYA :Performance Measurement and Reporting Taskforce, (2005) National Assessment Program Information and Communication Technology Literacy 2005 Years 6 and 10 An Assessment Domain for ICT Literacy. (Accessed May 29th, 2006) http://www.mceetya.edu.au/verve/_resources/ict_assessment_domain_file.pdf

Newhouse, Paul, C. (2002) *The Impact of ICT on Learning and Teaching.* A Literature Review for the Western Australian Department of Education, Perth, Western Australia. Available at http://www.eddept.wa.edu.au/cmis/eval/downloads/pd/impactreview.pdf (Accessed June 1st, 2006).

Appendix 1: ICT Literacy Progress Map

	Strand A: Working with Information	Strand B: Creating and Sharing information	Strand C: Using ICT responsibly
	This strand includes identifying the information needed; formulating and executing a strategy to find information; making judgements about the integrity of the source and content of the information; and organising and storing information for retrieval and reuse.	This strand includes: adapting and authoring information; analyse and make choices about the nature of the information product; reframing and expanding existing information to develop new understandings; and collaborating and communicating with others.	This strand includes: understanding the capacity of ICT to impact on individuals and society, and the consequent responsibility to use and communicate information legally and ethically.
6	Uses a range of specialised sourcing tools. Seeks confirmation of the integrity of information from credible, external sources. Uses tools, procedures and protocols to secure and retrieve information.	Uses specialised tools to control, expand and author information. Produces complex products. Critiques work and applies knowledge of conventions that shape interpretations when communicating across a range of environments and contexts.	Explains the impact and influence of ICT over time, recognising the benefits, constraints and influence of social, legal, economic and ethical issues on participation in society.
5	Searches for and reviews the information needed, redefining the search to limit or expand. Judges the quality of information for credibility, accuracy, reliability and comprehensiveness. Uses appropriate file formats and procedures to store, protect, retrieve and exchange	Uses tools to interrogate, reframe and adapt information. Uses a range of tools to create and enhance the design, style and meaning of information products to suit the purpose and audience.	Identifies the social, legal, economic and ethical consequences associated with using ICT across a range of environments and contexts.

	information.		
4	Develops questions or keyword combinations and selects appropriate tools to locate information. Appraises located information for relevance, currency and usefulness. Uses tools to structure, group and reorganise information for retrieval	Integrates and interprets information from multiple sources. Selects and combines software and tools to structure, link and present work. Communicates work for different purposes, environments and contexts.	Explains the need for laws, codes of conduct and procedures for ICT use in different contexts. Recognises the potential for misuse of ICT and that there are procedures to address this.
3	Identifies a search question, terms and suitable sources. Browses and retrieves information. Compares and contrasts information from similar sources. Organises and arranges relevant information and files.	Reorganises information from similar sources, using the main ideas. Selects software and tools to combine and transform text, images and other elements. Communicates work using different representations for particular contexts.	Recognises fair use, software restrictions and legal requirements. Identifies responsible use of ICT in particular contexts.
2	Identifies and uses keywords in a search to locate and retrieve information from various sources. Identifies and records relevant content.	Uses the functions within software to edit, format, adapt and generate work to achieve a specific purpose and when communicating with others.	Identifies codes of conduct and ergonomic practices for ICT. Recognises ICT terminology and use of computers in society.
1	Uses keywords provided to retrieve information from a single, specified source. Recognises information required. Opens software and saves files.	Identifies and uses some of the basic symbols and functions of software to record ideas.	Recognises and uses basic terminology and general procedures for ICT. Describes uses of ICT in everyday life.

DIGITAL TRANSFORMATION – ICT LITERACY PANEL.

Introductory information:

Digital Transformation, A Framework for ICT Literacy, is presented in a Report of the International ICT Literacy Panel (2002), set up by ETS, Educational Testing Service[3]. ETS brought together, during one year, eighteen experts from Australia, Brazil, Canada, France and the United States, on two major themes: 1) answer the crucial need of large-scale global assessments and smaller diagnostic tests to help governments, schools and private sector organizations, understand the breadth and gaps in ICT literacy across the world; 2) develop a workable Framework for ICT Literacy, that would provide the foundation for the design of assessment instruments. It is this framework, and its basic aim to lead to a clearer understanding of ICT literacy and ways to improve it, that is reflected upon here.

http://www.ets.org/Media/Research/pdf/ICTREPORT.pdf (Accessed on the 2nd of May 2006.)

1) Context, scope and intended audience of the framework

Although this framework is not aimed at teacher training, it is of great interest here because it tried to frame "what we already know about ICT literacy" and define "what we don't know" and provided a comprehensive definition of ICT Literacy that circulated widely

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[3] ETS, founded in 1947 with headquarters in Princeton, New Jersey, is an independent, non profit organization, devoted to educational research and assessment. It brings together, mostly in the USA, over one thousand experts in research and assessment to help educators around the world find new ways to advance learning through innovative assessments.

within the educational and research community. ICT literacy is not simply acquiring technological skills but it also encompasses using these skills as tools to transform everyday lives, communities and society. Hence the name of the framework, *Digital Transformation:* the transformative power or the capacity of ICT technology to transform, a novel dimension then, and that has since become one of the essential reasons for integrating ICT or digital literacy in education. The panel also advanced a set of "policy recommendations directed to governments, educators, NGOs, labor and industry" in the hope this would foster addressing the "real issues surrounding ICT literacy in its role in contributing to the development of human capital."

This framework is clearly set within a changing world, in a growing global ICT society. In this information society, technology has increased the importance of people's ICT literacy in their everyday lives. Theses competencies were first needed by specialised workers but nowadays, ICT has become common in homes and schools. Many simple activities require the use of technologies: searching for a book is made through an online catalogue, making a cash withdrawal is from a bank machine, accessing telephone messages, buying a bus or a train ticket are all done through machines, if not through online services. Thus, to be literate in a technological world means having technology-based skills and abilities.

Acknowledging the increasing efforts to identify the key job categories and skills needed by workers, and to train them accordingly, the Panel stated however that such efforts were only beginning to address the education and workforce ICT requirements. The framework produced therefore expands the existing concept of ICT literacy, convinced that "mastery of technology alone does not define ICT literacy".

2) Visions and objectives: What is the rationale of the framework? What are its aims and intentions? target group?

The framework defines the skills and knowledge required by students and adults as they complete secondary school, higher education or enter the workforce, to function successfully in a knowledge-based society. It is based on a belief in the transformative power of information and communication technology; for the panel, "technology tools, and the creative application of technology, have the capacity to increase the quality of people's lives by improving the effectiveness of teaching and learning, the productivity of industry and governments, and the well-being of nations".

The goal of the framework is to provide a "foundation for the design of instruments including large-scale assessments intended to inform public policy and diagnostic measures to test individuals' skills associated with information and communication technology". The panel thinks that these data will help the analysis of the outcomes and effectiveness of current public policies, education strategies, philanthropic investments, community initiatives and facilitate the design of new effective strategies for upgrading citizens to live and interact in the information society. Every person, group or community is a potential target group.

The notion of digital divide is extensively explored in this framework, with the need to ensure *equitable technology access* as well as equitable *opportunities to learn how to use ICT,* despite cultural, economic, geographical, physical, linguistic and gender differences and barriers. For the panel, the digital divide should no longer be defined only in terms of inequity in access to hardware, software and networks, but also by deficiencies in general literacy (reading, writing and numeracy) and a lack of crucial cognitive skills "needed to make effective use of these technologies. For them, *the digital divide reflects a greater societal divide that exists before the technological society*. So, the governments must work for the eradication of the poverty; ensure the universal access to education and healthcare at the same time it invests in technology infrastructure. But they must also eradicate the gap between technology proficiency and ICT literacy, which results from a lack of literacy, numeracy, problem solving and teamwork skills.

3) Basic components of the digital educational practices

◆ **Is there a "learning model", or "learning paradigm", which support the framework?**

There is no clear definition of a *learning model* employed in this framework, as the panel developed this framework as a basis for assessment purposes. However, it's possible to say, by looking at the kind of scenarios that are developed for measuring ICT literacy that *problem-based-learning* would guide the learning-process, and the nature of the task would foster the development of critical thinking.

The structure of the scenarios seems to be very rich in terms of providing inspiration for a training program based on a *problem-based-learning* and *learning-by-doing.* The main directions indicated in the framework – *access, manage, integrate, evaluate and create information* - are organized in a growing complexity. Thus, the more complex is the task, the more complex will be the nature of the critical thinking needed to produce a satisfactory answer.

Besides this hypothesis, others aspects presented as cognitive competencies (literacy, numeracy, spatial and visual literacy) are also articulated with the core that composes the ICT literacy (access, manage, etc) and this would imply a complex articulation between all these aspects when the person would be working in a task. However, it's difficult to imagine the kind of pedagogical activities that could be organized, based on this framework, to improve the basic proficiencies. The same applies to the highest level of competencies, the *individual (and social) transformation*. However, in trying to give examples of the kind of assessments that could allow a measurement of ICT literacy, each component is broken down in specific competence, ability and knowledge that could also be used to produce a training program.

◆ **What is meant by "digital literacy"? ICT literacy, media literacy, information literacy, e-literacy?**

For the panel, digital literacy (to deal with technological devices) is just one component of a broaden concept named *ICT literacy,* which is the *"ability to use digital communication tools and networks to access, manage, integrate evaluate and create information in order to function in a knowledge society".* The term "literacy" was preferred to competence, ability or fluency, literacy being understood as a dynamic tool that allows individuals to continuously learn and grow.

Five critical components, each specifically defined, form a basic cluster of skills and knowledge, and are organized in increasing cognitive complexity:

Access – knowing about and knowing how to collect and /or retrieve information.

Manage – applying an existing organizational or classification scheme.

Integrate – interpreting and representing information. It involves summarizing, comparing and contrasting.

Evaluate – making judgments about the quality, relevance, usefulness, or efficiency of information.

Create – generating information by adapting, applying, designing, inventing, or authoring information.

<div align="right">(Digital Transformation, a framework for ICT Literacy, p.17)</div>

But, mastering theses competencies is not sufficient for defining ICT literacy: this concept is broadened to include *cognitive skills* composed of *general literacy* (reading, writing and numeracy), *critical thinking* and *problem solving.* Without these others skills and

competencies, "true" ICT literacy is not attained. All these concepts and theirs interactions are presented in the figure 2 below:

ICT LITERACY

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┌────────────────────────────────────────────────┐
│               ICT Proficiency                  │
│                                                │
│   Increasing Complexity of Knowledge and       │
│                 Expertise                      │
│                                                │
│   Access   Manage   Integrate   Evaluate  Create│
└────────────────────────────────────────────────┘
         ↗                           ↖
┌─────────────────────┐     ┌─────────────────────┐
│ Cognitive Proficiency│     │ Technical Proficiency│
└─────────────────────┘     └─────────────────────┘
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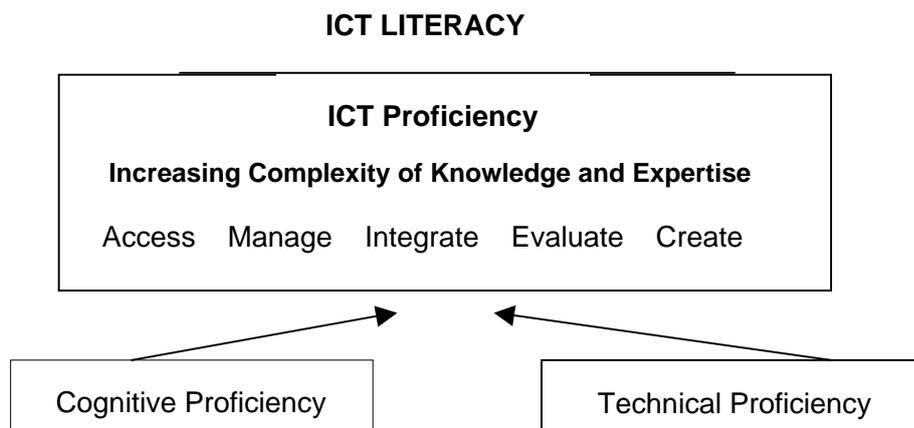
(Adaptation of Figure 2, *Digital Transformation, a framework for ICT Literacy*, p.18)

- *Cognitive proficiency* = foundational skills of everyday life at school, at home and at work. They include literacy, problem solving, numeracy and special/visual literacy.

- *Technical proficiency* = the basic components of digital literacy, a foundational knowledge of hardware, software applications, networks and elements of digital technology.

- *ICT proficiency* = the integration and the application of cognitive and technical skills tha enables the person to maximize the potentiality of the technology. At their highest level, this proficiency foster the person to innovate, to promote individual and social transformations.

The combination of these proficiencies results in the development of *ICT literacy*, that enables persons to access, manage, integrate, evaluate and create information, and also fosters *innovation*, *individual transformation* and *societal change*.

The assessment is seen as a *holistic* one, meaning it will be made by presenting to the person a set of activities ("scenarios") which are address one or more of the ICT components (access, manage, integrate, etc.) in a domain, as close as possible to real world activities.

4) Strategies. How is the framework to be implemented?

The development of the framework follows the same process as the one used for others assessment programs, the International Adult Literacy Survey (OECD & STATCAN 1995, OECD & HRDC 1997, OECD & STATCAN 2000) and, the Reading Literacy Survey, a part of the Program for International Student Assessment – PISA, OECD, 1999. The six steps consist of:

1) Producing a definition of literacy - which will sets the boundaries for what will be assessed. This step includes the domain, the skills and the abilities;

2) Organizing the domain – identifying the kind of tasks that would represent the skills and abilities proposed in the definition and establishing a list of them. The tasks must be categorized to inform the test design and resulting in a meaningful score reporting;

3) Identifying key characteristics of the tasks – in order to construct the tasks themselves,

4) Identifying and make operational variables associated with the tasks;

5) Validating variables – make statistics studies for ensure prediction's performances (identifying which variables compose the percentages of variance in the distribution and understand task's difficulties);

6) Building an interpretative scheme – construct the arguments to explain the tasks difficulties and examine the performances.

The work of the panel stopped at the step 2, the other steps implying a specific context, purposes and sponsors. The framework shows some "scenarios" that are, in fact, examples for step 3, set in a context identified from the domain (employees in a company that would be asked to provide information about a subject, and they have to send a e-mail messages to someone, or, another set inviting the trainees to search information about a specific theme on the websites). Each of the five components of ICT literacy definition (assess manage, integrate, evaluate and create) would lead the construction of specific tasks. The framework resulted from the work of the panel who had five meeting during one year for this interesting project. The report "provides a consensus definition of ICT Literacy and a model that can be used to further operationalize this construct for a variety of purposes" (p. 21).

5) Evaluation of the framework: what has been planned, realised?

There's no information that this framework has been implemented and an evaluation already planned.

UNESCO – ICT IN TEACHER EDUCATION.

Introductory information:

The two documents analysed were produced in 2002 by the Division of Higher Education of the UNESCO Education Programme. *A Planning Guide* provides a framework for ICTs in teacher education. It describes the essential conditions that teacher educators, administrators, and policy-makers must meet if the are to successfully infuse, integrate, or embed ICTs into teacher education. *A Curriculum for Schools and Programme of Teacher Development*, also known as the Andersen and Weert Report, stems from an IFIP[4] Working Party and proposes both a curriculum in ICT for secondary schools and a programme of professional development for teachers. While the first document develops a "new view of the learning process" and provides a rationale, a framework and a strategic technology plan for integrating ICTs into teacher education programmes, the Curriculum document proposes a four stage ICT development for schools, going from an approach where ICT is ermerging as a separate component becoming available, to a transforming approach where the school has evolved into an open learning centred resource environment based on an intensive integration of ICTs.

http://unesdoc.unesco.org/images/0012/001295/129538e.pdf (05/01/2006) – Curriculum)

http://unesdoc.unesco.org/images/0012/001295/129533e.pdf (05/01/2006 - Planning Guide)

1) Context, scope and intended audience of the framework

The framework concerns ICT in teacher training and *A* UNESCO report, "*Teachers and teaching in a changing world*" (1998), had already pointed out the real danger for the school's legitimacy as a social institution if there no changes are implemented, especially new social values, needs and rules. The conclusion of this proposal addresses the need for upgrading every citizen to independent living and awareness, well skilled and having the knowledge needed to take part in a healthy and more dynamic society.

Many social values are requested in the framework for supporting the idea that the school has as important role to play in this evolution of society. But is also possible to identify that is the danger of the legitimacy of this social institution that also pushes the actual movement towards ICT integration in the educational system into the UNESCO's frameworks. For this organization, the school as it is structured and functioning today, doesn't prepare students in terms of knowledge, abilities and skills needed for the economic exigencies in the 21st century.

As a proposition to resolve this problem, three paths have been opened by UNESCO in the two documents indicated above. It comprehends the propositions about:

1) a *curriculum for ICT secondary schools*, with students aquirring competencies for their future professional activities ;

2) a programme for the professional development of the *teachers in practice*, enabling them to ensure the application of the ICT curriculum indicated above (these two propositions can be found in the document (*A Curriculum for schools and programme of teachers development*);

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[4] IFIP is the International Federation for Information Processing, a non-governmental, non-profit umbrella organization for national societies working in the field of information processing. It was established in 1960 under the auspices of UNESCO.

3) a *framework for teachers in education* (pre-service teachers), to promote the growing up of the competencies and abilities needed for the future teachers, ensuring the continuity of the modernization's process in the educational system (*A Planning Guide*)

In the foreword of the framework it's stated that the UNESCO strategic objectives in educational are "improving the quality of education by the diversification of contents and methods and promoting experimentation, innovation, the diffusion and sharing of information and best practices as well as policy dialogue". It's also pointed out that *only upon a strong model for the appropriate and effective use of ICT to enhance the teacher-learning process that the knowledge of ICT's skills would be useful in education.* With this, the authors draw a critic about obtaining the ICDL (International Computer Driving Licence) without a deep link with the aims of educational process.

2) Visions and objectives: What is the rationale of the framework? What are its aims and intentions?

The challenge indicated in the frameworks is how to transform the curriculum and teaching-learning process (transforming the traditional paradigm of teaching towards a learner centred process) to provide learners (actual students, teachers in action and future teachers) with the skills and competencies to function effectively in a changing environment. The rationale and the aims inserted in each one of the three frameworks will be detailed below.

♦ The curriculum and the teacher's development:

The main aim concerning the learners is to promote the development of a group of competencies, seen as necessaries to live and work in the information society. The ICT curriculum takes in account these competencies as targets to be reached:

- the critical thinking,
- generalist broad competencies,
- ICT competencies enabling expert work,
- decision-making,
- handling of dynamic situation,
- knowing to work in a team,
- communicating effectively.

The structure which supports the school's curriculum corresponds to a model of the ICT integration's process in the school. For the authors, four *approaches* can be identified:

- *Emerging approach* = the school is exploring the possibilities and consequences of using ICT in learning process (and in the whole school system), the curriculum reflects an increase in basic skills accompanied by the awareness of the uses of ICT, but still based upon a teacher-centred practice.

- *Applying approach* = the school adapts the curriculum fostering the use of ICT in different subjects/areas helped by specific tools/software, but the learning process is still teacher centred.

- *Infusing approach* = ICT is integrated across the curriculum and the school context reflects the technology presence (laboratories, classrooms equipments, etc.). Teachers explore new possibilities to change their professional practice and personnel productivity.

- *Transforming approach* = the ICT is completely integrated in the daily activities, the curriculum is truly learner-centred and the learning process includes real-world applications, to be resolved by a problem-resolution approach.

These steps are the basis of the school's curriculum proposed, as synthesized in the figure below:
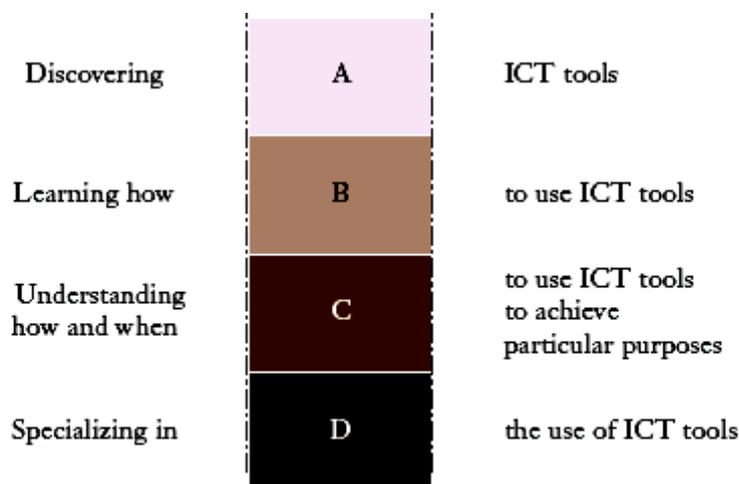

Discovering	A	ICT tools
Learning how	B	to use ICT tools
Understanding how and when	C	to use ICT tools to achieve particular purposes
Specializing in	D	the use of ICT tools

Figure 2.2 Model of stages of teaching and learning with and through ICT

A Curriculum for schools and programme of teacher's development", p. 17

In parallel, the teacher's development program is deeply related with these approaches and structures. Some competencies have been identified for the teacher's development as an objective to be reached by this program. Some of these competencies are technical ones; others correspond to the teacher's reflection about the learning process and, more generally, ICT in the school, consequences, issues, barriers and repercussions in the society. The detail of these competencies will be given below.

♦ **A framework for teacher's education (future teachers):**

The principal focus is to include ICTs in the complete teacher's education. The future-teachers must experience IC technologies in their own learning process in order to integrate the value of ICT in education. This will ensure that the educational transformations will be one ongoing process and will last. The expression "*reflection about ICT and education"* seems related to the idea of "*giving a meaning to ICT in their future professional practice and in the educational context*".

The framework states that ICT:

a) Should be infused into the entire teacher education programme;

b) Should be introduced in context (teachers in pre-service must see theirs teachers using ICT in innovate ways in order to transfer this philosophy into their own future work fields);

c) Students should experience innovative technology-supported learning environments in their teacher education programme.

It's clear in the framework that the ICT integration must be subordinate to the teaching-learning process, with the help of strong models for the effective and appropriate use of these technologies in education. Without this configuration, the technological skills acquired will be useless for the school. This means that teachers (and future teachers) must be deeply convinced about the role that ICT has to play in the education, seen as a *tool that can*

enhance the learning process, make it richer, and furthermore, make it *more effective* because allowing students to acquire knowledge in their professional domains but always taking into account that these domains are now inserted in a technological context.

To include ICT in the teacher's education means changes in the pedagogical paradigm: mainly, the shift from teacher-centred to students-centred. The future teachers must be more active during the entire learning-process as a condition to becoming more committed in their own professional development. The framework takes into account the influence of the learning context shaped by meaningful pedagogical activities, deeply related with *real situations developed with ICT.*

◆ **What is meant by digital divide? What are the researches on which it is based?**

The digital divide is not an issue as such, but the idea of *ensuring the equality of access to the technology for every student* is clearly indicated and the proposition of a secondary school's curriculum based on the ICT's integration shows that the idea of digital divide is deeply present in the frameworks.

But, taking in account the concept of digital divide in this case doesn't leads to the idea of *upgrading every person at the same level of skills and competencies everywhere in the world*. The respect towards cultural differences, social values and others related concepts are clearly taken in account. As a consequence, the tool-kit developed by the authors (in the three propositions), would help each institution to make a kind of diagnostic about the actual development level of the institution, placing it in a kind of *continuum* organized by the approaches concerning the ICT integration process. The "diagnostic" points out some directions to be followed in order to upgrading the actors involved (students and teachers), implement changes in the curriculum in harmony with the specific and actual institutional conditions (infrastructure, teacher's commitment with ICT in education, etc.).

3) Basic components of the digital educational practices:

◆ **Is there a "learning process model", or "learning paradigm" which support the framework?**

Different theories/authors supporting a new view of learning are briefly presented at the beginning of the "Planning Guide" framework: Vygotsky's social cultural theory, Jean Piaget, Jerome Bruner, Problem-based learning, Anchored instruction, Distributed cognition, Cognitive Flexibility theory, Cognitive apprenticeship, Situated learning, Self-regulated learning. Uniting all these theories and models, the ideas of student-centred, contextualised learning and learning-by-doing-and-giving-meaning through reflection seem to support the new pedagogical paradigm that the framework has been built upon.

Actually, it seems that this "learning-by-doing" consists in, for the future teachers, to immerse themselves in a pedagogical situation where ICTs are employed with success. Different pedagogical strategies are suggested: the students can watch recorded situations of pedagogical practices, applications, strategies, etc. After watching, they explore and practice these strategies in a contextualised learning-set. This action invites students to take a "different path" (from a traditional learning process), and pursue the three main objectives that are:

1) To give a view of how ICT in education can be used (even if based on a few situations experienced), almost like giving them a "pattern", a practical reference on *how to do it*;

2) To reflect about this pattern giving it a pedagogical meaning, finding reasons, theoretical constructs about how ICT in education can enhance learning – *why to do it*;

3) To integrate this "paradigm" in his/her professional activity, "replacing" the traditional experiences, ideas, values, etc., acquired at school as a student - *keep on doing it.*

Concerning the ICT curriculum and the teacher development program, the same learning models and learning theories function as supports.

◆ **What is meant by "digital literacy"? ICT literacy, media literacy, information literacy, e-literacy?**

This expression is not developed as a concept in the frameworks. Instead of this, the ideas usually contained inside seem to be kept into the *technical issues*, but much more in a "skills meaning" than in a wider interpretation.

Idem as digital literacy, the concepts above are not developed in the frameworks. However, some examples in different topics of the framework point out *abilities (in a technical way) in using media software or other products* in order to make hypermedia presentations, hypermedia compositions, projects and process designs, communication, etc.

Different competencies have been indicated for the actors whom the frameworks are aimed at.

The curriculum and teacher's development:

As indicated above, *students' competencies* cover technical skills but also high order thinking that enable learners to use and understand ICT in their own learning process and also, to "transfer" these competencies into new situations. It's even supposed that some of the students would plan to go into professions deeply related with ICT, and the basis needed to integrate successfully these future high studies would be ensured at the secondary school.

The ICT skills can be resumed by the figure below which covers four stages:

Table A.1   Four curriculum modules comprising the ICT curriculum for secondary schools

Module	Name of Module	General Description
A	ICT Literacy	Designed for students to discover ICT tools and their general functions and uses.
B	Application of ICT in Subject Areas	Designed for students to learn how to use ICT tools in the different subjects studied in secondary school.
C	Infusing ICT across the Curriculum	Designed to aid understanding of how and when to use ICT tools to achieve particular purposes, but without being restricted to particular subjects.
D	ICT Specialization	Designed for students who plan to go into professions that use ICT such as engineering, business, and computer science, or who plan to advance to higher education.

A Curriculum for schools and programme of teacher's development", p. 65

The general competencies identified for the students are deeply related with the professional world:

- the critical thinking,
- generalist broad competencies,
- ICT competencies enabling expert work,
- decision-making,
- handling of dynamic situation,
- knowing to work in a team,
- communicating effectively.

The teacher's development program follows the same directions pointed for the students: the improvement of the professional practice. The technical skills take the first step in the program and it must lead to the increasing awareness of new opportunities to apply ICT in the teaching process in the future. Even if the directions for both students and teachers are the same, the use which will be made for both actors will be necessary different. So, the teacher's program in ICT literacy has been organized as indicated below.

Table 5.1 Description and rationale for nine ICT Literacy units in a programme of teacher professional development

Unit	Description
A1 Basic Concepts of ICT	• to identify and understand the functions of the main components and of various peripherals of a typical information and/or communication system. • to understand the main functions of the systems software environment in relation to the main generic applications software.
A2 Using the Computer and Managing Files	• to use the main functions of the systems software environment and to utilize its features in relation to the main applications software being used.
A3 Word Processing	• to use a word processor skilfully and intelligently to produce various readable and structured documents.
A4 Working with a Spreadsheet	• to understand and make use of a prepared spreadsheet.
A5 Working with a Database	• to understand and make use of a prepared database.
A6 Composing Documents and Presentations	• to make and use graphical (re)presentations.
A7 Information and Communication	• to understand and be able to communicate with computers online, with sources of information, as well as with other people.
A8 Social and Ethical Issues	• to understand the social, economic and ethical issues associated with the use of ICT. to explain the current situation and trends in computing against the background of past developments.
A9 Jobs and/with ICT	• to be aware of the nature of change of jobs in one's own discipline and in the teacher profession itself, to be aware of the way ICT plays a role in these different jobs.

A Curriculum for schools and programme of teacher's development", p. 47 (the rationale are not presented here)

Concerning the general competencies needed for the teacher working in an ICT context, they all reflect an increasing understanding about the teacher's action in a technological learning process and also, fostering the teacher to be committed in an ongoing personal lifelong learning process. For each one of the levels which cover the ICT integration in an educational institution (discovering, applying, infusing ICT to improving learning), different general competencies has been identified for the teachers. For instance, concerning a teacher which works in a school considered as *applying ICT to teacher's subject areas*, the competencies highlighted, named *abilities* are:

- to decide why, when and how ICT tools will contribute to teaching objectives, and how to choose from among a range of tools;
- to manage a class-based learning environment using team work to achieve teaching objectives;
- to decide when whole class or group multimedia presentation will be useful;
- to analyse subject specific multimedia educational software;
- to assist students to find, compare and analyse information from Internet, and from other sources specific to a subject area;
- to select and use appropriate tools to communicate, according to teacher's own objectives, with colleagues or students;
- to use ICT efficiently, choosing training sessions and participating in new developments in order to enhance professional development.

A framework for teacher's education (future teachers):

The framework is presented as a holistic one, which articulates four general themes with fours clusters of competencies.

The *four themes* are:

- context and culture - focuses the factors that must be considered in infusing technology into teacher education curriculum;
- leaderships and vision - refers to the administration of the teacher institution, which must ensure support and leadership;
- lifelong learning - intends to commit the teacher in a ongoing learning process after the school period, specifically related with ICT education;
- planning and management of changing - enhances the importance of a planning and an effective management of the change process requested.

The *themes* are seen as a support of the *clusters' competencies*, and these ones are seen as critical for a successful use of ICT as tools for learning. The competencies are presented below:

- The *pedagogy*'s competency - supposes the teachers' development of applications within their disciplines that make effective use of ICT to support and extend teaching and learning.
- *Collaboration and networking* - is based upon the idea that the communicative potential of ICTs to extends learning beyond the classroom walls and fosters teachers' development of new knowledge and skills.
- *Social issues* - cover the idea of teachers' responsibilities of assuring equitable access to technology resources, caring for individual health and respecting the intellectual property (we can say that there's the ethic point).
- *Technical issues* - relates with update skills with hardware and software.

A figure shows the interactions and relationships between the competencies and the themes:

Figure 2.1 A Framework for ICTs in Teacher Education
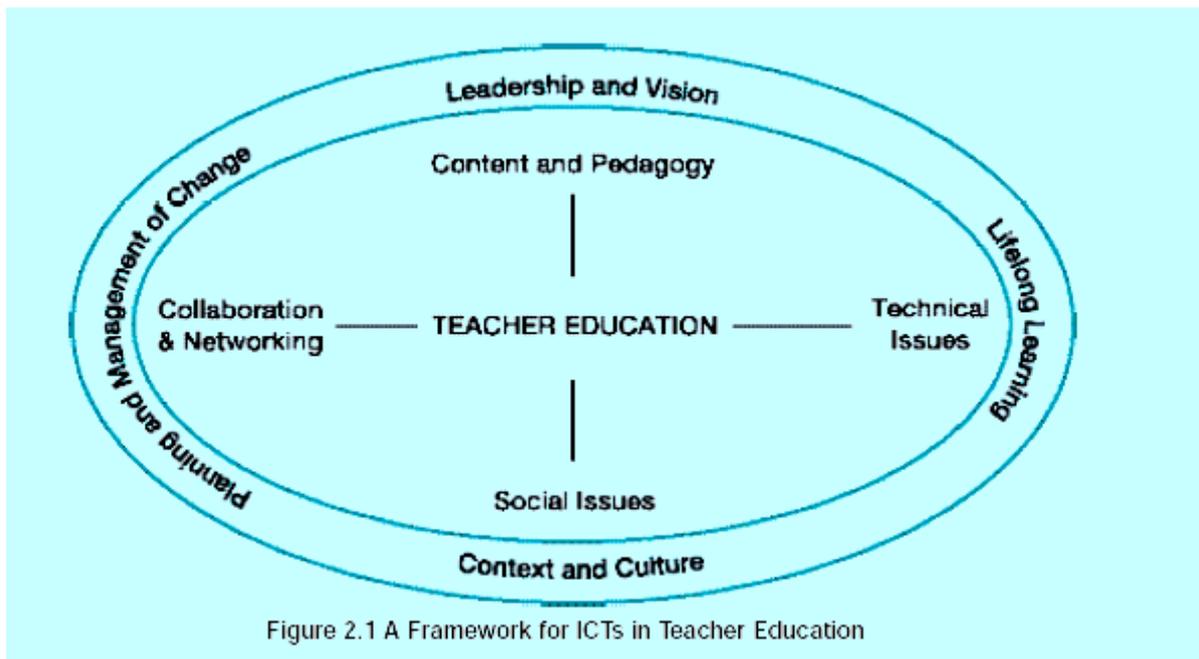
(Information and Communication Technologies in Teacher Education. A planning guide, p. 41.)

4) Strategies: How is the framework to be implemented? is there a toolkit to be used?

The curriculum and the teacher's development:

One of the tools presented in these frameworks is a *matrix* to be used as a guide for assessment revealing the level of the institution. Nine indicators have been selected and the characteristics of each one into the different levels of integration of ICT are presented in the matrix cells, revealing to the educational institution's managers the particular level of the school. (*The matrix is presented in this document in two parts; the first one shows the indicators in the horizontal line and the levels in the vertical line. The second part shows only the levels corresponding to the nine indicators.*)

The indicators selected cover not only aspects like *pedagogical paradigm* or the *professional programs for teachers and staff development already planned*. Other themes like infrastructure, the relationships with the community, etc are articulated in this tool. It seems clear that the matrix have been built upon the main ideas that compose the framework, as show in the figure 2.1 presented above.

While the levels of ICT integration are *emerging, applying, infusing and transforming*, the indicators selected cover *vision, learning pedagogy, development plans and policies, facilities and resources, understanding of curriculum, professional development for school staff, community and assessment*.

Once this step taken (the institution's evaluation produced), the school's managers can consider the directions presented for building an *ICT curriculum* and a *teacher's development program* (both presented in the section above) starting from the actual level of the institution toward the evolution's levels indicated. The matrix is presented below:

Table 3.1. Matrix of indicators to determine a school's stage of progress in implementing ICT in terms of four approaches to ICT development and eight characteristics of schools

	Emerging	Applying
Vision	Dominated by individual interest. Limited. Pragmatic.	Driven by ICT specialists.
Learning pedagogy	Teacher-centred. Didactic.	Factual knowledge-based learning. Teacher-centred. Didactic. ICT a separate subject.
Development plans and policies	Non-existent. Accidental. Restrictive policies. No planned funding.	Limited. ICT development led by specialist. Centralized policies. Hardware and software funding. Automating existing practices.
Facilities and resources	Stand-alone workstations for administration. Individual classrooms. Computers and printers. Word processing, spreadsheets, databases, presentation software. School administration software. Games.	Computer lab or individual classrooms for ICT specific outcomes. Computers, printers and limited peripherals. Word processing, spreadsheets, databases, presentation software. ICT software. Internet access.
Understanding of curriculum	ICT literacy. Awareness of software. Responsibility of individual teachers.	Applying software within discrete subjects. Use of artificial and isolated contexts.
Professional development for school staff	Individual interest.	ICT applications training. Unplanned. Personal ICT skills.
Community	Discreet donations. Problem-driven. Accidental.	Seeking donations and grants. Parental and community involvement in ICT.
Assessment	Equipment-based. Budget-oriented. Discrete subjects. Didactic. Paper and pencil. Controlling. Closed tasks. Responsibility of individual teacher.	Skills-based. Teacher-centred. Subject focused. Reporting levels. Moderated within subject areas.

A Curriculum for schools and programme of teacher's development", p28.

Infusing	Transforming
Driven by subject specialists. Discrete areas.	Leadership. Acceptance by entire learning community. Network-centred community.
Learner-centred learning. Collaborative.	Critical thinking and informed decision-making. Whole learner, multi-sensory, preferred learning styles. Collaborative. Experiential.
Individual subject plans include ICT. Permissive policies. Broadly-based funding, including teacher professional development.	ICT is integral to overall school development plan. All students and all teachers involved. Inclusive policies. All aspects of ICT funding integral to overall school budget. Integral professional development.
Computer lab and/or classroom computers. Networked classrooms. Intranet and Internet. Resource-rich learning centres. Range of devices, including digital cameras, scanners, video and audio recorders, graphical calculators, portable computers, remote sensing devices. Video-conferencing. Word processing, spreadsheets databases, presentation software. Range of subject-oriented content. Multimedia authoring, video/ audio production. Range of subject specific software.	Whole school learning with ICT with access to technology resources and a wide range of current devices. Emphasis on a diverse set of learning environments. The whole range of devices in the column to the left and web-based learning spaces. Brainstorming. Conferencing and collaboration. Distance education. Web courseware. Student self-management software.
Infusion with non-ICT content. Integrated learning systems. Authentic contexts. Problem solving project methodology. Resources-based learning.	Virtual and real-time contexts, new world modelling. ICT is accepted as a pedagogical agent itself. The curriculum is delivered via the Web and staff in an integrated way.
Subject specific. Professional skills. Integrating subject areas using ICT. Evolving.	Focus on learning and management of learning. Self-managed, personal vision and plan, school supported. Innovative and creative. Integrated learning community with students and teachers as co-learners.
Subject-based learning community providing discrete, occasional assistance, by request. Global and local networked communities.	Broad-based learning community actively involved parents and families, business, industry, religious organizations, universities, vocational schools, voluntary organizations. Global and local, real and virtual. School is a learning resource for the community – physically and virtually.
Integrated. Portfolios. Subject-oriented. Learner-centred. Student responsibility Multiple media to demonstrate attainment. Moderated across subject areas. Social and ethical as well as technical.	Continuous. Holistic – the whole learner. Peer-mediated. Learner -centred. Learning community involvement. Open-ended. Project-based.

A Curriculum for schools and programme of teacher's development", p29.

Others tools can be found in the papers. For instance, the details concerning modules and units planned for the ICT curriculum for secondary schools are proposed, organized by ICT integration's level. Related with this modules and units, some examples of ICT projects applying ICT are given, also organized by ICT integration's level (appendix A, B, C and D), helping the teacher to realise what is focused on ICT integrated in a learning process in different levels) and how to concretise the objectives (courses, lessons, objectives, methodology, etc.) .

A framework for teacher's education (future teachers):

Recommendations are given for composing a program based upon the framework:

a) Use the framework when planning the infusion of ICT;

b) Plan a curriculum congruent with the educational vision, the culture and context of each region/institution, both locally and globally;

c) Take into account *"conditions to be assured"* such as: promoting shared vision, assuring access, selecting skilled educators (teachers of the future-teachers), planning professional development, composing contents standards and curriculum resources, using by a student-centred approach of learning, programming assessment of the effectiveness of technology for learning, assuring community-support and support policies;

d) Plan the curriculum to promote future inter-cultural collaborations with others institutions, composing learning communities with other schools and countries.

There's a more practical level presented as a guide for a strategic technology plan, composed by three phases:

Organisational phase:

a) Select a planning team – a leader and members – taking in account the "key holders" groups in the context;

b) The planning team determines the scoop of the work and planning tasks to be accomplished (the core of the framework – areas and competencies – have to be used since this moment);

Assessment and analysis phase:

a) Identify the level of technology knowledge and skills of teacher educators;

b) Compose the teacher educational curriculum and select the teacher's ICT standards;

c) Ensure the teachers facilities, current technology resources and infrastructure within institution;

d) Develop goals and objectives to reinforce a powerful vision for ICT in teacher education.

Formulation phase:

A technology plan is developed including all the subjects indicated plus timelines, areas of responsibilities and detailed budget.

If the framework doesn't present a whole toolkit as a guideline, different specific tools are suggested into the entire paper as examples that can be found in the web to training specific skills. There are also presented some examples of standards for teachers' ICT from different countries.

Some *basic strategies* to ensure a successful plan are also indicated:

a) to focus on teaching and learning rather than on hardware and software;

b) to ensure the access of the technology resources and the technical and pedagogical support in order to allow students to apply the new knowledge learned;

c) to give the time and the conditions to practice - professional development is an ongoing process;

d) to start with a small group of teaching staff which would permit to determine the specific interests and needs of the teachers educator;

e) to provide a variety of options for the professional development, and for this, explore collaboration opportunities with partners outside the university.

Four stages are deemed necessary for a teacher to be "fluent" in ICT in education:

- the first one must helping teachers to be aware about (have information about) the relevant applications of ICT in education and the way that they may be used for each person/context;

- the two others stages must give to teacher the opportunities to explore the use of these tools/applications. During these three stages, the pedagogical strategy may present to the students some "cases" to be analysed, criticised by the students and even demanding them to improve the cases with a "personal touch". These actions might foster students to understand, to give meaning and to picture out some ways to introduce ICT in pedagogical activities.

- The fourth and last one stage might foster teachers to be "innovators and modellers of excellence practice for their students and colleagues". In the section VIII of the framework, Images and Scenarios, some cases are presented as examples.

5) Evaluations of the framework: what has been planned, realised?

Nothing is presented as an evaluation already planned for this specific framework. Nevertheless, other project evaluations are reported within the document (MATEN – Multimedia Applications for Telematic Educational Networks/Central and Eastern Europe, Mirandanet/England; InTent Project/England, Enlaces/Chile, etc).

6) Further reading for an augmented understanding:

Paolillo, J., Pimienta, D., Prado, D, & al., (2005) Measuring Linguistic Diversity on the Internet, UNESCO, Montréal. http://unesdoc.unesco.org/images/0014/001421/142186e.pdf

UNESCO (2006) *Literacy for Life.* 4th edition of the EFA (Education for All) Global Monitoring Report 2006. http://portal.unesco.org/education/en/ev.php-URL_ID=43283&URL_DO=DO_TOPIC&URL_SECTION=201.html

UNESCO (1998) Teachers and Teaching in a Changing World. World education report. UNESCO Publishing, Paris. http://www.unesco.org/education/information/wer/PDFeng/wholewer98.PDF

DIGITAL COMPETENCE.
FROM ICT SKILLS TO DIGITAL « BILDUNG »[5]

Introductory information:

The Norwegian Ministry of Research and Education (UFD) commissioned ITU (Network for IT-Research and Competence in Education), than a research community, and since January 2004, a permanent national academic unit at the University of Oslo, to develop a report on the concepts of *ICT as the fourth basic skill* and *digital competence*. The basis for this request was the need expressed by the Ministry to acquire greater knowledge of this topic. The report, which came out in June 2003, was written by Morten Soby, Researcher at the [University of Oslo](), presently Network Leader of ITU. Although this paper was not initially a formal framework, its considerable impact within the educational community justifies its choice in this research corpus.

URL: http://folk.uio.no/mortenso/Dig.comp.html

Also available on the DigEuLit website: http://www.digeulit.ec/docs/public.asp

1) Context, scope and intended audience of the framework

The initiatives, recommended in the report, for ICT in education 2004-2007 aims at relating Norwegian educational practice directly to the knowledge needs and challenges of the information society. With this framework, the UFD (Ministry of Research and Education) is urged to decidedly opt for integrating in its education policy "digital competence". Concerning teachers and students in all phases of schooling, this ambitious national initiative aims at helping them become "interactive participants in a global information society".

The initiative is unfolded in three main directions:

a) fundamental skills in using ICT tools,

b) basic ICT skills integrated in specific subjects,

c) a focus on a broader digital "bildung" or competence.

"Bildung" refers to an integrated, holistic approach that enables reflection on the effects of ICT on human development. It is presented as a fourth basic or fundamental skill, to be integrated with the first three, reading, writing and arithmetic. This fourth basic skill[6] is the sum of those fundamental skills required for the computer certificate combined with the interpretative and critical use of ICT in the form of digital competence. It specifically includes "communicative competence, critical thinking skills and enculturation processes". Hence this initiative brings forth a more dynamic and holistic view of the connection between basic and ICT skills and knowledge through the concept of digital "bildung" or competence.

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[5]. "The German term "Gildun" has no equivalent in any other of the European languages. 'Bildung' not only implies the dimension of teaching but also that of learning, not only knowledge and skills, bu talso vaues,ethos, personality, authenticity and humanity." Ekkeard Nuissl, in Federighi, Paolo, *A Glossary of adult learning in Europe*, UNESCO Institute of Education.

"Debates on the concept of *bildung* run in two veins: a collective concept concerned with what is the true and correct cultural inheritance, and an individual concept with a focus on the "self" culture and identity. See Rune Slagstad, et.al. (eds.): *Dannelsens forvandlinger* (*Bildung's* Transformations) Oslo: Pax (2003)" Quotation from the DC (Digital Competence) ITU Report .

[6] . In reference to Andresen's four fundamental cultural skills : reading, writing, numeracy and use of ICT. *School in Time.*(1999). Veile: Kroghs.

2) Vision and objectives: What is the rationale of the Digital Competence Framework? What are its aims and intentions?

The DC (Digital Competence) ITU report is not exactly a framework, but it has all the components and will be considered as such for this analytical approach. It begins by presenting a vision of what is aimed at in terms of tomorrow's school. Such a school will not only have integrated digital tools and the skills to use them, but will be completely digitally organized. This entails not only a secure broadband infrastructure and a new curriculum, but also the use of virtual laboratories for experimentation, of computer games, of digital folders, of digital learning resources in a national learning network, and also the systematic upgrading in schools, digital evaluation means and long-range support.

In reference to the 2003 national programme, eNorway 2005[7], the DC report makes a strong case for full integration of digital technology in schools at all levels. As it had often been observed, there was a lagging behind of professional education actors as compared with society at large in the taking up of digital technology. While eNorway clearly endorsed ICT skills and competence for all Norwegians, some educational programs, especially teacher education policies, were still ignoring the challenges of digital ICT. The report underlines that "ICT is consistently insufficiently integrated in the educational guidelines". and points to national educational policies which still failed to incorporate existing practices and were not providing the leadership for further development.

The report argued strongly in favour of generalising ICT technology and broadband access. But its strongest claims were for developing "competence throughout life", that is the competence to, not only access digital information, but the central skills needed to comprehend, condense and critically evaluate accessed information, and the overview, presentation and structuring skills to communicate with digital tools. The digital divide that is pointed out is not the obvious discrepancy in equipment, but the more fundamental challenge of developing the ability to learn throughout life. Only the integration of ICT in education can "counter the development of digital divides".

3) Basic components of the digital educational practices

The report builds on existing policies, plans, documents and concepts from several countries as evidenced in the reference section. It refers explicitly to specific reports for the concepts used:

 - Digital Horizons, New Zealand Ministry of Education's strategy for schools for 2002-2004;

 - Digital Transformation, A Framework for ICT Literacy, the report of the Educational Testing Service (USA) that is analysed in this corpus;

 - e-Europe, the 2000 Lisbon plan setting the 2010 goals for the European economy;

 - Summit of the 21st Century Literacy, of Berlin 2002.

◆ **Is there a "learning process model", or "learning paradigm" which support the framework?**

The report does not endorse one specific pedagogical model, learning theory or teaching theory. It presses for resources that allow "various learning trajectories" and emphasizes pedagogical multiplicity and variation.

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[7] "Digital teaching aids must supplement traditional methods; and the challenge will lie in developing all-inclusive concepts involving several teaching aids. All students will have access to a PC with an Internet connection. Commitment to broadband in schools is an essential prerequisite for developing new teaching methods and reinforcing the overall widespread use of broadband". http://odin.dep.no/archive/nhdvedlegg/01/03/eNorw040.pdf

♦ **What is meant by "digital literacy"? or ICT literacy media literacy, information literacy, e-literacy?**

The basic concept is **digital Bidung or digital competence**.[8] This concept is referred to the approach developed in the Swedish ICT strategy for schools, with its emphasis on "digital culture" alongside basic skills. This is to be understood as the knowledge referred to in English as "digital literacy", which "in Swedish terms is translated to basic digital competence". "This should not be understood as a requirement for technical knowledge, but rather linking together skills and knowledge about technology, the ability to relate ICT to the surrounding society and giving prominence to creative elements in learning". The "bildung" concept therefore includes the ability to handle information technology and to interact cognitively and culturally with tremendous amounts of digital information. It builds on the three categories of key competencies that have been defined by the OECD DeSeCo project, that is acting autonomously, using tools interactively and functioning in socially heterogeneous groups. The digital competence is also defined as a vision, capable of empowering all Norwegian to face the challenges of a changing global information society.

The **digital literacy** concept is referred to Gilster's definition: "… the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers", including problem solving and critical thinking. The comments are taken mostly from an information literacy approach.

ICT literacy is also an important concept and is refered to the ETC paper: *Digital Transformation*. Here the concept links the information competence to digital technology, understood as "a continuum from daily life skills to the transformative benefits of ICT proficiency".

The report insists on the need for a change and an active integration of digital technology and digital competence in education at all levels. It has some concrete suggestions concerning the need for broadband access or for digital tools and methods for exams and evaluation, but not overall approach to specific measures.

The report does not go into a detailed description for curriculum content or training beyond pointing to the need to re-design the curriculum and teacher training guidelines. It refers to the orientations already present in the eNorway 2005 national report, such as the paragraph "Flagship project: IT training for teachers", in which specific objectives are stated:

"The Government will offer refresher courses in IT to 40,000 teachers. The training will focus on the pedagogic use of IT, including the ethical dilemmas and legal challenges posed by Internet use and source validation. Additionally, a larger project has been implemented to ensure that all newly qualified teachers have basic skills in the pedagogic use of IT in teaching and learning." Deadline: The close of the academic year 2003/2004."

4) Strategies : How is the framework to be implemented ?

This aspect is not part of the report

5) Evaluation of the framework: what evaluation tasks have been planned, realised?

ITU is specifically in charge of fostering innovation in the academic and pedagogical use of ICT in learning and education – in primary and secondary education and teacher

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[8] As the report points out, "Debates on the concept of *bildung* run in two veins: a collective concept concerned with what is the true and correct cultural inheritance, and an individual concept with a focus on the "self" culture and identity. See Rune Slagstad, et.al. (eds.): *Dannelsens forvandlinger* (*Bildung's* Transformations) Oslo: Pax (2003)" Quotation from the DC (Digital Competence) ITU Report.

training. ITU is also in charge of conducting researches that evaluate the development and use of digital learning resources within the framework of the Programme for Digital Competence 2004–2008[9]. ITU, as a national R&D unit in the field of ICT and education, develops researches and disseminates knowledge to relevant players in the education sector. It is therefore a major source of information on what is being implemented and the results that have been gathered concerning the different initiatives, projects of programmes. Some results are available in English through the annual ITU reports on the ITU website. (http://www.itu.no/filearchive/ITU_annual_report2004.pdf Latest report available.)

PILOT, one of Norway's larger and most extensive innovation projects linked to educational use of ICT in schools, represents a national initiative in this area, and is focused on organizational and educational conditions and levels of activity. For a period of four years, 120 schools were involved in the project. General goals of the project have been to support participating schools as they develop educational and organizational opportunities through the use of ICT. PILOT was initiated by the Ministry of Education in 1999, and completed in 2003. ITU has been responsible for coordinating the research and research groups that have been involved in PILOT. The final PILOT report was completed in October 2004." (ITU 2004 annual Report) "PILOT research was mainly based on qualitative methods and activity research, but quantitative surveys have also been conducted. In the qualitative, observation-based research, researchers followed a number of schools for four years. In the quantitative part, students, teachers, and principals at a number of control schools responded to a questionnaire at the beginning and end of the research period." (ITU 2004 annual Report)

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[9] http://odin.dep.no/ufd/norsk/satsingsomraade/ikt/045011-990066/dok-bn.html (not available in English).

I-CURRICULUM – MINERVA ACTION

Introductory information:

The I-Curriculum Framework results from a European project, funded by the EUROPEAN COMMISSION within the SOCRATES-MINERVA Programme, 2002-2004 (100783-CP-1-2002-1-GR-MINERVA-M). Its development is based on « an analysis of current curriculum requirements for teaching digital technologies, relevant literature, and case studies involving innovative teaching ». The objective of the project was to establish a European framework for defining the key metaskills and metaknowledge needed for living in the digital age.

"An underlying tenet within the I-Curiculum project is that there are new ways of knowing and being in the world. It is not sufficient that a curriculum just adopts the simple operations of the tools that make those new ways of knowing and being possible. For example a student is not truly digitally literate if they are only taught the mechanics of a modelling tool like how to enter formulae into a spreadsheet. New ways of knowing mean that there are new things to know, new ways of organising knowledge and new ways of classifying knowledge." (*Policies and Planning*, p. 6)

The analysis presented here is based on the deliverables produced by the project, which include the study of national implementation of the project's output. http://promitheas.iacm.forth.gr/i-curriculum/outputs.html (page accessed on 21.02.2006)

1) Context, scope and intended audience of the framework

The framework is focussed on the evolution of society today, understood as a *knowledge society* within which ICT is a reality which brings social and psychological transformations by the interaction between persons and technology in different and currents fields of activities. These transformations are caused by a new context resulting from the presence of the new digital tools which provide "both a new arena of opportunity and a new set of challenges for educational systems, for curricula and for teachers across Europe". The key distinctive features of digital technologies are identified as: *provisionality, interactivity, wide capacity and range, speed and automatic functions*. The new digital resources are seen as "responsible for transforming not only our working and educational practices, but also our experiences of time, of space, of knowledge, of narrative and of social relations".

The idea of "*living in a changing world*" is very important in this framework. Taking into account this configuration means looking carefully at the *cognitive competencies of the user*, not only those needed to function with a tool but also those which can enable him/her to reflect about *technological tool*s in terms of new uses, pertinence of uses, consequences about uses. The focus is more on acquiring "meta-competencies", a wider concept if compared to cognitive competencies. The focus is more on acquiring "meta-competencies", a wider concept as compared to cognitive competencies. In such a context, the key skill becomes the ability to actively take part in lifelong learning.

The "changing world" highlights some specific concepts: knowledge, information and learning became central in this configuration. In this *changing context* configuration, the user of these technologies has a central place seen as controlling his/her cultural experience, shifting from the supposedly passive role of "viewer" to the active role of "player" and "maker".

As a result, the educational system is presented in the framework as the place where fundamental changes must take place: the skills/competencies and meta-competencies

needed to deal with this context are identified by the framework's authors and the next step is successfully embedding them in a school curriculum. These skills, competencies and meta-competencies cannot be acquired through skill training but through carefully analysed, planned and supervised pedagogical activities by teachers having a different role in the learning-situation. The activities will focus on *different digital literacies*.

The framework has the ambition of being European; henceforth, the changes announced/targets aren't seen under the same point of view within the different cultures. The differences in each country in terms of abilities, skills, competencies, but also in terms of values, cultural meaning, etc, are respected. The main idea is to invite teachers to engage on reflection about their *"current activities in order to realise what has been done and to be able to improve what is to be done"* (p. 4, Guidelines for emergent e-competencies at school).

2) Visions and Objectives: What is the rationale of the framework? What are its aims and intentions?

The I-Curriculum framework represents an important move from a key skills approach to a focus on high quality learning and comprehensive learning activities. Therefore preparing students for the world of tomorrow is not only having them acquire skills and content, it is developing meta cognitive capacities, empowering them to reflect on "what we need to know, how we come to know and how we express our knowing", so that they can, through life long learning capacities transform their own thinking. This transformational approach of learning activity is based on socio-cultural theory.

Four specific objectives are presented for reaching the main aim which is "to establish a European framework for *defining information skills and a curriculum* appropriate for living and learning in a digital age". These objectives are:

1) To identify the key meta-skills/competencies and meta-knowledge needed for living in the digital society;

2) To explore the digital tools, artefacts and pedagogic practices been able to foster the development of a broad digital literacy;

3) To construct a framework for the description of curricula in terms the information or meta-knowledge they cover

4) To develop curriculum in information technology.

In another words, the framework could "*help in the examination of current curriculum and learning design, locating the process within the demands of changing cultures and mapping educational provision onto demands of new contexts in which life, work and educational interact*". (p. 6, Skills needs in the digital age).

The teacher must begin to reflect *about his/her own practice*, taking, for instance, one pedagogical activity, *analysing it with the help of the tools presented*, and *planning transformations to be implemented* in this activity taking in account the objectives presented in the framework. Like others frameworks (AusPict – EPICT, or UNESCO) the target is change in the teacher's pedagogical practice and, in this specific case, the change might lead to the development of meta-competencies and meta-knowledge in the students (and the teacher), integrated with different digital literacies.

Digital divide is stated as "a fact" and understood as more engaging than simply inequity in access to the technology: it comprises many others aspects such as the perceived relevance of technology in the group or individual, the existence of social networks which can ensure motivating uses of ICT and maintaining functioning of the technology, and also promoting input devices to the users accompanied by appropriateness of interface.

3) Basic components of the digital educational practices

♦ **Is there a "learning process model", or "learning paradigm" which support the framework?**

Like the majority of the frameworks analysed, this one is based on a learner-centred paradigm, with the difference that a particular learning model is highlighted as a guideline for the action of the teacher. The ideas of Vygotsky are presented as a constructivist model, and even if this term is not the best to classify this learning theory, the main ideas of the model are followed: learning is a social context situated action, the learner is active and builds his/her knowledge by interacting with others and with the guidance of the tutor (teacher), the technology is seen as a social artefact integrated/to be integrated in the school. The nature of the activity is very important, because it begins by respecting the level of competencies of the learner and proposes to raise this level by actions specially inserted in the tasks and the pedagogical activities developed by using ICT.

A brief discussion about learning paradigms (*conjectural* and *revelatory*) is presented in the framework, revealing that the authors believe in a strong articulation between the nature of pedagogical practice and an identified learning model applied within the practice. But, if we take the idea of constructivism as an "umbrella" (as it's said in the framework), some concepts extracted from other learning models would be added to this first *vygostkyan approach*: Piaget, Popper and Papert are mentioned, and these authors are recognised as taking part in a *conjectural paradigm* which supposes that "knowledge is created through experience and evolves as a psychological and social process". Thus the educational process rests upon working with "student inputs, finding metaphors and model building" (p. 22, Skills need in the digital age). Other assumptions like 'learning is the result of a problem-oriented approach' and different concepts borrowed from the cognitive theories are part of this theoretical background.

If it's possible to identify a certain coherence for the learner in terms of the learning model sustaining the framework, the same cannot be said for the teacher's evolution. It's clear that what has been described above corresponds to the paradigm that the authors would expect teachers to accept and implement, a clear direction presented as being the "right one" to promote change in the educational system.

But what is the learning model proposed to the teachers? It seems that it's the "*learning-by-doing-and-reflecting-about-what-has-be-done*". In fact, it's the principle of the framework. The teacher must be aware about his/her own learning model/paradigm, change it if it doesn't correspond to the learner-centred approach by informing himself/herself, either by reading, either by looking at the innovative practices of other teachers, or by taking part in network communication or personal communication to discuss innovative practices, etc. And, during this process, the teacher is regularly reflecting upon his/her own practice, transforming it gradually and evaluating the changes through reflection and critical thinking.

♦ **What is meant by "digital literacy"? ICT literacy, media literacy, information literacy, e-literacy?**

Digital literacy refers to the *competencies required to effectively exploit tools, develop practices/create new ones and to deal with symbols systems made available by digital technologies*. These practices are seen inserted in a cultural context, sustained by human relationships structured by values and social meanings. By saying this, the authors are building their framework on the understanding of literacy as an ideological practice, an approach developed by Street and the London group: "Literacy needs to be conceives within a broader social order". The idea of multiple skills is introduced, and the authors state that more important than composing a list of skills to be trained by the learners is to foster different policy makers, educational institutions in different European countries, to explore their own curriculum to find out what they can promote and what needs to be promoted.

Despite the immensity of the task, the teacher is the key partner in the framework, and the work of reflecting, evaluating and transforming is supposed to be made by him/her.

In order to identify these competencies which will enable everyone to be "digital literate", the authors have passed in revue what they called the key features of the knowledge society, shaped by the digital technologies. As a result, some activities have been detected as characteristics of the digital world and mastering them represents what the authors refer to by «digital literacies»:

a) *modelling* –being able to creating digital analogues systems for analysis and experimentation;

b) *knowledge management* – being able to conducting research, combining information/knowledge to create new ones, navigating through information webs;

c) *multimodality and hypertext* – develop new ways to read, to create documents by combining different media;

d) *electronic communication* – dealing with the panoply of ways in which inter-human communication is developed and taking part in these different virtual contexts to share information;

e) *gaming* – being able to identifying how digital games can exemplify ways of thinking and working in a digital domain.

To these literacies is added *computer literacy*, or the ability to manipulate current computers, future ones, network computers and every other technical tools which support the others literacies.

Within this large context, the authors of the framework were interested in finding out how adapted were curriculum today for improving the learners' competencies so that they could develop confidently these kind of activities. The question is not integrating inside the curriculum subjects like "modelling" or "electronic communication". It's how the pedagogical activities, developed inside specific knowledge domains, already include or can include strategic actions/means/goals that involve these literacies and will foster developing the competencies needed for them.

The framework is presented through a matrix organising four crucial literacies that can be practiced at three levels of skills/competencies. This structure can become the basis of curriculum. The literacies are placed in a vertical axe:

a) Exchanging and sharing information; communication and collaboration,

b) Researching: finding things out,

c) Modelling,

d) Working practices, attitudes and emergent values.

Each one of these literacies is crossed by a continuum's skills/competencies levels organised in three levels that can be identified or applied in the current curriculum (horizontal axe):

a) Operational or practical level, which means learning how to use the tools and technology effectively;

b) Integrating or knowledge level, which means understanding when the uses of the technology are applied to the current curriculum fostering efficiency, motivation and effectiveness;

c) Transformational or critical reflection level, which means critically examining one's actions and metacognitive reflection made by the user (learner and teacher) on what he/she might know, how and when to be able to realise the changes due to the technology and the transformations that might be improved in the curriculum to reflect this awareness.

A sample of this matrix illustrates, for one digital literacy, 'exchanging and sharing information', the detailed level that has been attained in the framework.

The I-Curriculum Matrix

	Transformational	Integrating	Operational
Exchanging and sharing information; Communication and collaboration			
1) Learners should develop the ability:			
• To explore information with a variety of ICT tools • To communicate information with a variety of ICT tools • To collaborate supported by ICT tools	• Sharing and developing practice for communication and dissemination of ideas that relate to a variety of contexts – that apply existing understanding to develop new contexts • To reflect critically on their own and others' uses of ICT to help them develop and improve their ideas and the quality of their work • To make explicit the desired outcome by considering the audience and what they require and analysing the impact of the various mediums that could be used. • When communicating with others consider users beyond the immediate task	• To select and apply appropriate ICT tools to explore and communicate subject knowledge in learning tasks • To communicate with others using authentic language of the subject and process • To recognise information and presentation varies according to audience and medium • To use a range of ICT tools efficiently to draft, bring together and refine information and create good quality presentations in a form that is sensitive to the needs of particular audiences and suits the information content	• The ability to use common ICT applications to explore text, still and moving images and music • To communicate electronically with text, still and moving images and music • To present information in a variety of forms that are fit for purpose • To understand the basics of digital technology and their terminology

(p 8. Guidelines for emergent e-competencies at school).

Behind these three levels of competencies we can identify a lot of particular skills, competencies and also meta-competencies that are mentioned throughout the entire framework, but aren't presented as training objectives themselves. Instead, they might be addressed indirectly by pedagogical activities especially composed with the help of the teacher.

The particular feature of this framework lays on this strategy: the deep changes targeted, evolution in teacher's mentality in terms of his/her representation of teaching and learning, the higher order of thinking to be developed by the learner, the implementation of a pedagogical context that leads to the digital literacies.

Examples of *high order thinking* for the digital literacy *modelling*, are:

- discover all pertinent concepts,
- extract potential relationships between concepts,
- exclude unnecessary concepts,
- find out the right representation system,
- identify and provide inputs data,
- elaborate appropriate outputs formats,
- test the outputs against reality or beliefs,

- revise the outputs in consequence of the testing.

Some groups of meta-competencies are also mentioned: self-regulatory orientation in order to structure a problem solving process, which supposes deep self-orientation, systematic orderliness, accuracy, evaluation and elaboration. Skills allowing the user to develop a critical, self-determined and reflective reception of contents are also indicated, as the ability of shaping the technology and its contents in social interaction.

4) Strategies: How is the framework to be implemented? Is there a toolkit to be used?

The matrix can be seen as one piece of the toolkit since it summarizes all the ideas inserted in the framework. At the page 12 in the document "Guidelines for emergent e-competencies at school, a matrix is presented and in each cell is described the an aspect of the digital literacy in each level of competency:

	Transformational	Integrating	Operational
Exchanging and sharing information AND Communication and collaboration	• Make metrics to evaluate the benefits of an (ICT) activity • To work within a community of practice on knowledge-rich tasks	• To recognise and infer information from different formats • To know the style for communicating effectively	• To know the terms used • To understand the basics of computers
Researching: Finding things out	• Design or evaluate systems that are commensurate, valid, communicative, authentic, reliable, legible and plausible, explicitly consider the limitations and constraints	• To recognise the appropriate level of detail for task • To recognise the need to analyse these data sources, e.g., is it reliable?	• To use spreadsheets, word processing tools, databases – add elements, format, checking procedures etc.
Developing ideas and making things happen	• Evaluate the assumptions and values embodied in particular models and modelling systems	• Be able to relate the results to the instructions and outcomes	• To be able to read the values given by the technology
Working practices and attitudes	• To analyse societal and individual consequences of the use of ICT in economic, political and cultural terms and how information affects opinion	• To be aware of questions of equity in access to, and use of, ICT	• To know risks and advantages of using technology and how to act prudently

Lighter versions of the matrix have been developed. They are meant for teachers to reflect upon their own practice when inserting a special pedagogical activity. The annex A facilitates reflection on one's values in terms of teaching aims, evaluation process applied to students, aspirations in composing a pedagogical activity/task, barriers found and transferability. This is presented through a series of questions. The annex B facilitates comparison of one's pedagogical scenario with the I-curriculum framework: the teacher has to write his/her answers. The annex C groups eight examples of cases where the teachers can visualise how others teachers innovate. The interesting point of these cases study is the way that the matrix is employed, allowing the teacher to identify which literacies are embedded in the pedagogical activity that is analysed and what level of competencies this activity can improve in the learners. One example is presented as follow (page 25, Guidelines for emergent e-competencies at school):

I) Case study: Web Quest in foreign language subject-English (Spain)

In this activity the native Spanish students are meant to improve their English rather than develop digital literacy skills explicitly. The 13-14 year old students perform computer-based activities in one-hour lessons held weekly over the course of a year. They work in a class of 14 in pairs at a computer with Internet access and standard Microsoft Office applications. One activity asked them for information about being a responsible consumer, for example, considering the ethics of Nike or McDonalds. To complete this, the students must do a survey, research and document their findings, then create reports with appropriate images and data analysis that would be presented and discussed with their classmates. The teacher was proficient but not an expert in MS Office and the Internet. He marked the students' ability at the task rather than their proficiency at computers. The students were encouraged to help each other during the classes.

- **Mapping to I-Curriculum matrix**

Exchanging and sharing information; Communication and collaboration	Researching: Finding things out
The students display operational skills in that they must use common applications to explore the Internet, and present the information that is found in text or presentation software. Communicating with their peers and teachers about what has been discovered and then bringing it together in a way that answers the question using the correct linguistic terms represents integrating skills, as does recognising how to vary information according to medium and audience. Finally it is transformational in that by encouraging collaboration the students have an opportunity to exchange information on their peers work.	The task requires the students to understand what information is required to decide about responsible consumption, and then find it effectively and check its accuracy. This is operational. However, in order to do well they must be systematic when deciding what information is needed and ensure the data collected answers the question. The discussions on approach taken within the class and the construction of the presentation may involve transformational thought.
Modelling – Developing ideas and making things happen	**Working practice and attitudes**
The activity could involve some modelling, if the students take the information found and then implement some way of extrapolating trends, this would require operational skills. The act of designing the model from which trends can be extrapolated is an integrating skill. If they decide what further information would be required, how it could be gathered, and go on to test this, the students have used transformational skills.	The students will become aware of how organisations publish data through their research. In addition to this operational knowledge the students should reflect on how the organisations present information in order to achieve maximum benefit, and what information is missed. This is an example of using integrating skills. The task requires them to look at the ethical, political and economic consequences of being a responsible consumer, but depending on choice it also causes reflection about how technology is used in this process, ie transforming understanding.

Other resources are indicated in the framework like websites, articles, books and other information sources. The teacher is supposed to find out the resources which can help him/her to improve their awareness about the subjects. It's not clearly presented in the framework how these tools have to be employed, how the program takes place. It's possible to deduce that the institution which would apply the framework might organise the procedures.

But, by reading a sample of testing studies made by the authors, it seems that the use of the matrix for diagnostic of teacher's activities reveals exactly what has been happening and shows the directions that could be taken to improve the pedagogical activities (*2nd Iteration Report*).

5) Evaluations of the framework: what has been planned, realised?

Two evaluation stages were planned. The first one was to test the framework in two school-based activities as experimental cases, from September 2003 till February 2004. Action-research was coupled with observation techniques and focus group discussions. The objective was to identify strengths and weaknesses in the curriculum for the acquisition of key skills by the learners and evolution of the teacher's practice. The second stage expected to cover a large number of schools in the five countries which have participated to the framework's elaboration. It was scheduled from January to June 2004.

Most of the reports are made available on the website http://promitheas.iacm.forth.gr/i-curriculum/outputs.html. Two documents accessed show that the testing was successful, that is that the application of the framework for diagnostic on a

group of schools (specifically, in analysing the pedagogical activities developed by a group of teachers) reveals with a good level of precision the nature of the activities proposed to the students in terms of their richness to raise digital literacies in different levels of competencies (operational, integrating and transformational levels). Having identified the gaps, it is quite easy to decide on changes, to make suggestions, to point out some directions to improve these activities.

6) Further Reading for an augmented understanding

i-Curriculum, (2004) *Skill needs in the digital age*, Deliverable 1.

(2004), *Guidelines for emergent e-Comptetences at Schools*. Project Report.

(2004), *Policy and Planning for Digital Literacies*. Project Report.

(2005) Mapping of concepts of digital literacy onto the current and projected school practices. Deliverable 2.

i-Curriculum Spanish web site: http://www.ub.es/euelearning/icurriculum/

Ulicsak, Mary, (2004), *Digital literacy and the I-Curriculum project*. NESTA Futurelab,UK.

THE EUROPEAN PEDAGOGICAL ICT LICENCE – DENMARK.

Introductory information:

EPICT is the European Pedagogical ICT Licence, launched in 1999 in Denmark. Its focus is the continued professional development of teachers in the pedagogical use of ICT in education. The training combines the acquisition of ICT skills with purposeful integration of ICT in classroom pedagogy using small teams working in their familiar school environments and takes about eight months to complete. In Denmark, there exist ten different and specially designed courses covering the entire range of education settings where teachers intervene. There is an export version that is widely used in Norway and pilot versions that exist in Hungary, Greece, Italy, Iceland and Tasmania (Australia), and specific African pilots in Ghana, Uganda and Cameroon. http://www.epict.org

http://www.uni-c.dk/generelt/english/education/ict-licence.html, (Accessed May 2nd 2006)

1) Context, scope and intended audience of the framework

The underlying aim of the EPICT is to empower citizens to "live in the information society". This new context is seen as imposing a new social configuration, in terms of communication and rebuilding citizen identity, because traditional hierarchical structures do not correspond to network and multimedia communication. With the information society emerges *a new organisation of knowledge* (multidisciplinary, evolving, multimedia), *novel ways for expressing ideas and opinions and communicating* (writing, reading texts, pictures, sounds, online, with mobile phones, through new online scripting genres, etc), *social competences needed in a new work organisation* (groups, teams, networks and collaboration between different groups or communities, etc) and *specific knowledge for using new tools for living in this context*. The school is the site chosen to reach this goal and the objective of the educational system must be to provide the opportunity for teachers and students to develop the qualifications needed to become an independent and active citizen in the information society.

The framework is therefore focused on schools and teacher training, but it also addresses innovation in schools. Consequently, the professional development of the school management, which can be "both an important agent of change and an efficient road block to change", accompanies the training of teachers, providing thus "a solid and powerful basis for real and innovative change of the school's organization and practices. (Hojsholt-Poulsen, 2005)

2) Visions and objectives: What is the rationale of the framework? What are its aims and intentions? Target groups?

The EPICT framework is based on the awareness of the importance of the professional development of teachers in the pedagogical use of ICT as a key to successful and meaningful integration of ICT in education. This in-service training of teachers needs to address the mastery of basic and advanced ICT skills and competences within a pedagogical problem-based rationale. Teachers need to consider, from the beginning, in what way they will be using pedagogically the specific ICT tool or skill they are discovering.

The framework combines *pedagogical knowledge of ICT integration* with *basic ICT skills training* in order to empower teachers in a personal and a professional level by focusing on pedagogical integration of ICT in the teacher practice. The basic objective is to ensure that teachers develop, beyond acquisition of basic ICT skills and experience with team-based work in a net-based learning environment, insight into:

- the impact of ICT on the role of teachers and students and on the pedagogical and organizational development of the school;
- the impact of ICT on the development of the subject.

The challenge is also to fulfil the conditions (technical, pedagogical and, indirectly, motivational) that will enable *the teachers to keep using ICT into their daily practice after having obtained the licence*. The training period must be a useful time spent and ensures a useful knowledge acquired. This acquisition needs to be done in such a way so as to develop lifelong learning attitudes, habits and capacities. Only then will there be an enduring pedagogical use of ICT in schools.

3) Basic components of the digital educational practices

♦ **Is there a "learning process model", or "learning paradigm" which support the framework?**

It's not widely developed but the main ideas that can be extracted from the papers are the concepts/learning model based on *problem-based-learning*, *student-involvement* and *reflection about an action*. The teachers are asked to produce activities directly connected with their classroom's practice and the product must be applied in a real learning situation with theirs students. It's suggested that the teachers will be invited to "take theirs students' place" and in this way, resolving a real problem they would be able to reflect about the pedagogical meaning of the ICT integration. This means: *how better use ICT inside a pedagogical action*, trying to offer to the students some learning-situations that will ensure the development of the competencies needed by them in the future. But, these ICT competencies seem presented in parallel of the school curriculum: the students have to learn how to write, and they can better learn it by using text-processing. We are tempted to say that *find the pedagogical meaning of ICT in education* is *finding a good place for it in the educational system, as it is*. Of course, it's possible to identify the idea of *student-centred learning* in the exercises presented but it's not possible to say that the pedagogical paradigm itself will be in the centre of the pedagogical reflections.

♦ **What is meant by "digital literacy"? or ICT literacy, media literacy, information literacy, e-literacy ?**

There's no special mention of digital literacy in the framework's presentation on the website, nor in the different papers about EPICT. The Danish initial name refers to IT and ICT seems to have been introduced with the translation. ICT literacy, media literacy, information literacy, e-literacy are implicit in the course content and refer to "competencies" mostly covered by the training, even if they aren't defined in theoretical terms.

CURRICULUM CONTENT: HAVE SKILLS, COMPETENCIES, HIGHER ORDER THINKING SKILLS BEEN IDENTIFIED? KNOWLEDGE?

However, the content of the "digital literacy" or "ICT literacy" concept can be appreciated through the curriculum content of the EPICT. The training course material covers four basic dimensions, such that in each module, there is

1. "A pedagogical analysis of the relevance of a particular type of ICT. This analysis contains a description of the software type and provides examples of how this particular piece of ICT can be integrated into classroom practice.

2. A set of exercises in the programs used in the module. These are exercises to enable teachers themselves to become familiar with the software.

3. ICT manual(s) for specific software. For example, a manual for MS Word.

4. Articles and other online resources to amplify and back up the pedagogical and ICT facets of the module."

Each of the sixteen modules which compose the framework focalises on one particular group of knowledge articulated: it's possible to say that the **technical skills are the guidelines of the modules' training** as being able to:

a) find information in the Internet,

b) use word processing,

c) deal with electronic communication and collaboration on the net, as a first step which finish with the proposal for the teachers to reflect about innovation in their pedagogical practice.

This first step composes the compulsory modules, that will enables the teachers to interact with peers and with a "facilitator" all the time spent for the training. There are sixteen technical skills proposed (16 modules, 4 compulsory and 12 to be chosen at least 4 from them, duration of the course about 6-12 months), and the teachers' choice will be determined by a common project to be realised in a team. *From the first module till the last, every technical skill will be inserted in a pedagogical goal and meaning*. The others technical skills are: working with images in the computer, using spreadsheets, making a presentation on the screen, web pages and communication on the web, using databases, making models and simulations, layout and desktop publishing, educational software, working methods and ICT, ICT as a compensating tool, ICT and reading skills and games and edutainment in education. In every one of theses technical competencies acquired, *the teachers must be able to reflect about the pedagogical meaning and goals to be reached with* and *reflect of the pertinence of this using in the educational system*: a kind of critical thinking that is not presented in these terms in the paper.

♦ **Are there specific knowledge "genres" that are privileged by digital literacy?**

We can't say that there are any particular knowledge's genres in a way that it the technical skills, even if they receive a special attention as a tool to be acquired, they must have learnt deeply inside a pedagogical reflection. If this specific point in the framework is not followed, it will result a list of technical skills trained and, in this case, the framework wouldn't have been implemented at all. But it's true that a great attention is paid at the technical skills (as writing, reading or using pictures, for instance), and it seems that these specifics literacy are supposed to be upgraded by the participants.

4) Strategies: How is the framework to be implemented? is there a toolkit to be used?

Five key principles organise the framework strategy:

- A professional development for teachers, developed by teachers and delivered by teachers

- A blended learning approach

- A pedagogical rationale as entry point for each course themes.

- Teamwork for teachers' development of material and learning scenarios to be used in their own daily praxis

- A 6 to 12 months course duration.

The main aim of the course is empowering educators in the pedagogical use of ICT. Educators are not instructed directly on the use of the available different programmes and applications. Instruction relies on self-study through accessing Web sites and pages related to each course. On these, there are guides for learning how to use all of the programs generally utilised in schools. The teachers experience blended, flexible learning, process-oriented learning, problem-based learning, and participate in collaborative activities and team-based assessments. Experience has shown that moving the focus from technical problems to pedagogical goals actually energises teachers with regard to coping with technical issues involved in setting up the pedagogical activity.

The toolkit is the material proposed and consists of a blend of resources and learning methods, both web-based and paper-based material. The authors think that the quality and consistency of the concepts treated within and the accompanying material is crucial to ensure the training. Each teacher must pass four compulsory modules (using Internet, word processing, communication and collaboration on Internet, and ICT development in schools), and choose another four between the other twelve presented. Teachers develop personal interaction and must compose a team - 2 to 5 members - during the very first meeting. A "facilitator" is allocated and accompanies the work till the end through electronic conferences. This facilitator deals solely with technical issues after the teacher has explored all other options. In the Danish system there is access to hop functions for practically all the different programs. The intention is exactly to train the teachers in such a way that they themselves develop competence in solving their own technical problems through self-study. Assistance by a technical expert should be a last resort only.

Once an educational institution has decided about its participation in the program, the teachers, that will take part in it, work through the first four modules, ending with a project built together. This project must be able to be implemented in their personal classroom once finished the draft elaborated by the team and presented to the facilitator. Each project step must be the object of in-depth pedagogical reflection: the teachers explore and decide what they expect the students to acquire, what pedagogical meaning this will have for the students' development, and what kind of tasks, of pedagogical activities are most likely to ensure this achievement. *This is the strong articulation between ICT and the pedagogical point of view, proposed in the framework, and constituting the main characteristic of this framework.*

After working in eight modules, each teacher receives a *licence* that doesn't result from a standardized assessment, but that confirms the teacher's level of competence, a level different or "better" as compared to the level already reached at the beginning of the training, in using in a confident way ICT in one's pedagogical practice. The challenge is to improve the teacher's knowledge and, most of all, to reinforce the confidence enabling him/her *to develop use of ICT and reflect on the learning process* (and, additionally, *keep learning how to use ICT in the pedagogical activities*).

5) Evaluation of the framework: what has been planned, realised?

Impact studies report a high level of satisfaction from the numerous teachers that have already obtained the licence (more than 60,000 teachers in Denmark, more than 20,000 Norwegian teachers). Besides internal studies such as the *Skole-IT, Impact Study 2,* June 2002, many independent studies have been done, and a continual evaluation by an external evaluator is done in Danish. Pilots' studies have also been made of the Greek pilot and of the Italian pilot, and others can be accessed in the home page of the ePICT, http://www.epict.org/organisational-setup/evaluation:index.html.

The evaluation of the Danish global framework "IT, Medier og folkeskolen" (ITMF), in English "ICT, Media and Primary and Lower Secondary School", 2001 – 2004, has shown that "pedagogy and didactics and management turn out to be absolutely essential to a change of practice regarding the use of ICT and media and school development in the long term". As regards teacher training, teachers were able to prepare ICT lessons in considerably less time than before. "Most teachers have increased the use of ICT in lessons where the students search information on the Net" (Evaluation of ITMF, 2005). On the whole the ITMF evaluation reported that many of the projects lacked a continuous involvement of the whole school or the whole municipality with a view to anchorage and dissemination of the results" (idem).

6) Further Reading for an augmented understanding:

Hojsholt-Pousen, Leo (2005), *The Pedagogical ICT Licence in Teachers' In-Service and Pre-Service Training,* UNI-C, The Danish It Centrefor Education and Research, Aarhus.: http://www.epict.org/presentations/files/The%20Pedagogical%20ICT%20Licence%20v6u.pdf (Accessed on the 2nd of May 2006)

Skole-IT Steering Committee (2002), *Skole-IT Impact Study 2*. (Accessed on the 2nd of May 2006)

Http://www.epict.org/organisational_setup/files/impactstudy.pdf

Gjørling, Ulla, (2005) The European Pedagogical ICT Licence Going Worldwide – A New Standard For Teachers' Professional Development In ICT and Education?, UNI•C, Denmark

The Pedagocial ICT Licence in Denmark UNI•C, http://www.uni-c.dk/generelt/english/education/ict-licence.html

EPICT Syllabus, condensed version, http://www.epict.org/files/EPICTsyllabus.pdf (Accessed on the 2nd of May 2006)

Ramboll Management A/S, (2005) *Evaluation of ITMF*, Overall results. UNI-C, Copenhagen. http://www.epict.org/organisational_setup/files/ITMF%20evaluation.pdf

AusPict : The Australian Pedagogical ICT Licence.

Introductory information:

AusPict, or The Pedagogical ICT Licence in Australia, is a methodology, developed in Denmark in the late 1990s by teachers, for teachers. It combines the acquisition of ICT skills with purposeful integration of ICT in classroom pedagogies using small teams working in their familiar school environments and takes about eight months to complete. This approach was transposed into the Australian context, translated and adapted to the Australian educational environment. Thirty-five staff members experimented this new training with six facilitators in 2005.

http://www.ausipict.com (Accessed May 2nd, 2006)

1) Context, scope and intended audience of the framework

The AUSPICT has been introduced in a landscape that already has witnessed many ICT educational initiatives[10]. Education was already one of the ten strategic priorities of the first *Commonwealth Strategic Framework for the Information Economy* (Australian Government, 1998). Two other important milestones are the reports *Learning for the knowledge society: an education and training action plan for the information economy*, (2000), and *Raising the standards: a proposal for the development of an ICT competency framework for teachers* (2002). This framework proposal is "only one of a number of significant national and local initiatives related to developing and supporting effective ICT use in school education."

The Pedagogical ICT Licence in Australia is a recent system adopted for developing teacher skills with ICT. Also known as the "European Pedagogical ICT Licence", its contents actually cover the "Action 2" planned in the *New South Wales Information and Communication Technology Skills action plan*, named "Skilling people for an information society". In this government plan, the goal is training every citizen in "It skills", which cover a range of *technical activities* (from reading an e-mail till to create and to maintain a complex computing and communication services) needed by "every person and business to participate fully in society into the future". NSW being the "information and communications technology powerhouse of Australia", it needs to raise the technical competency level of all its citizens in mastering the new tools for economic development, "the electronic world of high-speed digital networks", to ensure "New South Wales strengthens its position as a leading information economy". Although Tasmania is the region concerned with the first implementation of AUSICT, the licence is presented as an Australian initiative;

In the papers analysed for this work, it's possible to identify concepts like "living in an information society" where abilities such as *being able to communicate through multimedia resources* and *having skills for dealing with technological resources* are actual needs that must be satisfied *as fast as possible.* The government sees a great potential in the information industry, and argues that people are often unaware of the "many different and interesting jobs offered", in particular for the women with only 20 per cent included in the industry workforce.

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[10] The Australian education system comprises eight independent regional educational systems. Several government policies and action plans from both the federal and regional levels have focused on ICT and education in the last ten years. Australia has a strong "e-readiness" reputation.

There's no clear mention of the concept of digital divide. Nevertheless, in the government action plans at the turn of the century, the notion is implicit, related with an internal economic gap: one third of the Australian population did not use a computer, half did not use Internet, and people with low incomes, the unemployed, older people and people from rural areas were not able to deal with ICT. The challenge was to create the context for every one to access a computer and Internet and use them with confidence.

2) Visions and objectives: What is the rationale of the AUSPICT methodology? What are its aims and intentions?

Related with these main governmental goals, this specific methodology **for teachers** is focused on integrating pedagogical issues and the relevant ICT knowledge, competence and skills into the teacher training. The challenge for the teachers is to change their point of view, putting aside the technical resource problems (usually the main focus in many frameworks) in order to *reflect on the pedagogical issues* concerning what students need to acquire in the coming years (in terms of school abilities). In fact, it seems that by "pedagogical issues of what students need to acquired" is meant the training of students so that they will *have the competencies needed to integrate the social world of work and this, with ICTs*. Once this point of view has been internalised, the teachers need to plan pedagogical activities that will be concretised by using ICT. In other words, *the teacher must reflect about the meaning of teaching and learning in the "information society"* and the new social context. For achieving this goal, both teacher and students must learn how to use ICT, the mastery of tools being an essential step.

In a way, it's possible to say that one very important aim of the action would be a contribution to adapting *the educational system to the requirements of the economy.* The action is situated inside the school, aiming *to prepare teachers to use ICT into their pedagogical practice* but the goal that the teachers are invited to focus on is *the gains that this integration would produce for the students*, preparing them to enter the world of work.

3) Basic components of the digital educational practices:

♦ **Is there a "learning process model", or "learning paradigm" which support the framework?**

As said, the framework proposes a *teacher-centred, a classroom-centred and a teacher-implemented learning*. But, there's no extensive development of the concepts of *learning* or *teaching processes* employed which sustain the directions pointed above. Therefore, it's possible to deduce from the paper an orientation following the *problem-based-learning* as in the Danish framework, since AusPict has been built upon it. There are present concepts such as *learning-cooperation, collegiate involvement* and *reflection about action*, this third aspect related to the role of the facilitators. It seems that this "reflection" is narrowly connected with the idea of *finding the competencies needed by the students in their future professional life, in terms of ICT exigencies and offer (integrate, create, innovate) pedagogical activities that will ensure the development of these competencies*. It does not seem to be demanded of the teachers to reflect about the relationships between ICT and society or other broader aspects, but instead, the focus seems to be *on how to harmoniously integrating ICT in a pedagogical practice*. The concept of *pedagogical practice* as such is not one of the core issues reflected on.

♦ **What is meant by "digital literacy"? or ICT literacy, media literacy, information literacy, e-literacy?**

These concepts are not developed in the government papers analysed, nor in the Rawson and Naylor paper. However, Markauskaitè (2005) describes Australia's 'e-

readiness" as resulting from an implementation of action plans based on "much broader" notions of ICT literacy than would imply the strong focus on the "economic rationales of ICT literacy" and the importance given to "technical ICT-related skills" in the government plans and frameworks. Although one needs to read her paper, which is a detailed analysis of "ICT literacy in Australian school education", to grasp all the different connotations that have been addressed by different actions plans and frameworks, one can grasp the essential aspects with her initial definition of ICT literacy as "a broad transferable set of cognitive, non-cognitive and metacognitive capacities as well other human attributes, related to the use of ICT in various spheres of a 'knowledge society'. The concept covers various other terms with a similar or narrower meaning, including 'ICT skills', 'ICT competence'. 'computer literacy', 'digital literacy', 'ICT fluency', 'information literacy' and 'ICT proficiency'." (Markauskaitè, 2005)

However, the content of the "digital literacy" or "ICT literacy" concept can be appreciated through the curriculum content of the AusPict. The training course material covers four basic dimensions, such that in each module, there is

5. "A pedagogical analysis of the relevance of a particular type of ICT. This analysis contains a description of the software type and provides examples of how this particular piece of ICT can be integrated into classroom practice.

6. A set of exercises in the programs used in the module. These are exercises to enable teachers themselves to become familiar with the software.

7. ICT manual(s) for specific software. For example, a manual for MS Word.

8. Articles and other online resources to amplify and back up the pedagogical and ICT facets of the module."

The teachers are trained in specific topics: using Internet, word processing, communicating and collaborating on the Internet, ICT developments in schools, working with images, using spreadsheets, presentations on the computer, creating web pages, using databases, models and simulations, layout and desk top publishing, evaluate subject-specific software, models and simulations, working methods and ICT, ICT and special needs education, sporting students with disabilities, using computer games to support learning. As we can see, both of technical skills are matched with other competencies. For example, in the module on "Working with images on the computer", the teachers have to find, produce and process images to be used on the home page of the school or the class as drafts and tasks and information material for parents.

Pending further exploration of the modules (not all AusPict modules were available), there does not seem to be any explicit focus or mention of critical thinking or other levels of reflective thinking nor other metacognitive abilities or practices.

4) Strategies: How is the framework to be implemented? is there a toolkit to be used?

Rawson and Naylor (2005) present the AusPict strategy in the light of two existing methods that have shown important limits in the ICT training of teachers. The first one, which they identify as the "Osmosis" method, consists in surrounding the teacher with technology and let the teacher discover the uses, in the hope that the proximity and the use of the technology will somehow result in familiarity, skills and adapted use. This has regularly proven to be a sterile gamble. The other method, labelled "classroom" or "one-shot", is the organisation of formal classroom sessions, run by an IT expert with no knowledge of "actual teaching needs". This usually results in initial enthusiasm, but the teachers, having little opportunity to use their newly acquired competence in the classroom, usually find they have forgotten everything when an opportunity does come up to use software they thought they knew. The method chosen for AusPict is the "integrated" approach: teachers "learn ICT skills

needed for their own teaching" and during their training, are "encouraged to produce relevant work which they are able to take into their own classroom lessons". This method stresses personal involvement, collegiate approach and close monitoring of teachers' appropriation of the ICT tools, within a pedagogical scenario.

The methodology is a *teacher-centred*, *classroom-centred* and *teacher-implemented* one. A group of sixteen modules are proposed in the framework, and the specific curriculum of eight modules will be composed by each teacher: he/she must pass four compulsory modules (using Internet, word processing, communication and collaboration on Internet, and ICT development in schools), and choose another four between the other eleven presented. The choice is made through discussion and reflection amongst the teachers that will compose a work group (two to five members). This discussion must produce an integrated project work, reflecting the needs identified by the group in terms of the pedagogical issues to be acquired by their students. The training takes eight moths to be achieved, and the differences of abilities' levels and confidence at using ICT between the members are not seen as a problem. Each module will be developed by the group and must produce a product that will be implemented in their individual classroom, and integrated into their actual pedagogical activity. The group's work is followed by "facilitators",(assigned in the first module) who can be contacted through Internet conferences.

After working in the eight modules (nearly eight months), each teacher receives a *licence* that doesn't results from a fixed pattern assessment, but that confirms an actual different level ("better" as compared to the level already reached at the beginning of the training) in using in a confident way ICT in one's pedagogical practice. The challenge is to improve the teacher's knowledge and, most of all, to reinforce the confidence enabling him/her *to develop use of ICT and reflect on the learning process* (and, additionally, *keep learning how to use ICT in the pedagogical activities*).

5) Evaluations of the framework: Does it work?

It is of course too early to look at results for the Australian implementation. The Rawson & Naylor paper, refer to a study (*Skole-IT Impact Study 2*) made in June 2002 by Danish researchers on the in-service training course for teachers in primary and lower secondary schools. 35,000 teachers had by then already participated in the training course, and 1000 teachers were interviewed to evaluate the impact of the course. Most of the conclusions are highly positive and optimistic about the increase of confidence and real use of ICT in the pedagogical activities. Besides stressing the need to have continued access to maintained and up to date hardware and courseware, teachers want to continue improving their skills in two areas: "subject specific educational software" and "use of specific ICT tools".

Since the program began in 1999, 60 000 Danish teachers (more than 66%) have now participated in the Pedagogical ICT Licence in Denmark. (Hojsholt-Poulsen, 2005) The program has now achieved a European status, wit the European Pedagogical ICT Licence (EPICT) being available in several countries. Its distinguishing characteristic is to organize in-service training for teachers combining pedagogical knowledge of ICT integration with basic ICT skills training. Because the training addresses very concretely "how teachers may actually apply ICT to improve teaching and learning" (idem), it provides the teachers basic ICT skills which they are immediately relevant to their pedagogical situations

The EPICT framework, with such a successful and solid reputation, was an obvious choice for Australian teachers, but there is at this point no specific evaluation plan for AusPict presented on the AusPict website.

6) Further reading for an augmented understanding:

Candy, P. C. (2004). Linking Thinking. Self-Directed Learning in the Digital Age. DEST, Commonwealth of Australia.

DETYA. (2000a). Learning for the Knowledge Society. Department of Education, Training and Youth Affairs (DETYA), Canberra. http://www.dest.gov.au/schools/publications/2000/learning.htm (Accessed on the 2nd of May 2006)

DETYA. (2000b). Learning in an Online World: A School Education Action Plan in the Information Economy. Department of Education, Training and Youth Affairs (DETYA), Canberra. http://www.dest.gov.au/schools/Publications/2000/learning.htm (Accessed on the 2nd of May 2006)

Hojsholt-Pousen, Leo (2005), *The Pedagogical ICT Licence in Teachers' In-Service and Pre-Service Training,* UNI-C, The Danish It Centrefor Education and Research, Aarhus.: http://www.epict.org/presentations/files/The%20Pedagogical%20ICT%20Licence%20v6u.pdf (Accessed on the 2nd of May 2006)

ICT Industry Skills consultative Group, (2001), Skilling People for an Information Society, New South Wales Information and Communication Technology Skills action plan, New South Wales government, Australia.

Lonsdale, Michele & McCurry Doug, (2004) Literacy in the new millennium, Australian Council for Educational Research, (NCVER), Department of Education, Science and Training, Australian Government.

Markauskaitè, Lina, (2005), "Notions of ICT Literacy in Australian School Education", Informatics in Education, Vol. 4, N° 2, 253-280. Institute of Mathematics and Informatics, Vilnius. Available at http://www.vtex.lt/informatics_in_education/htm/INFE057.htm (Accessed on the 2nd of May 2006)

UWS, ACSA, ACCE and TEFA, (2002) Raising the standards: a proposal for the development of an ICT competency framework for teachers, and Raising the standards: Appendices to the Proposal for the Development of an ICT Competency Framework for Teachers, Report on behalf of the Commonwealth Department of Education, Science and Training, Australian Government. (Accessed on the 2nd of May 2006)

http://www.dest.gov.au/sectors/school_education/publications_resources/other_publications/raising_the_standards.htm

Rawson, John & Naylor, Andrew,(2005) AusPict: The Australian Pedagogical ICT Licence, Paper presented at ISATT 05 (International Study Association on Teachers and Teaching), Sydney. http://www.ausipict.com/pdf/ISATT05AusPICT.pdf   (Accessed on the 2nd of May 2006)

Skole-IT Steering Committee (2002), *Skole-IT Impact Study 2*. (Accessed on the 2nd of May 2006)

http://www.epict.org/organisational_setup/files/impactstudy.pdf

CEF-COMMON EUROPEAN FRAMEWORK – TEACHERS *U TEACHER*.

Introductory information:

The CEF is a Common European Framework on teachers' profile in ICT for Education in Initial Teacher Education (ITE) and in the Continuing Professional Development (CPD). The main aim of the framework is to help educational administrators, course designers, teachers, examining bodies, etc. to reflect on their current practice, coordinate their efforts and ensure that they meet the real needs of school in the knowledge society, within the European context. It is the outcome of a European Commission eLearning Initiative project, *uTeacher* carried out between December 2003 and June 2005.

http://www.univirtual.it/uteacher/devepro/framework_books.htm (Accessed on the 2nd of May 2006)

1) Context, scope and intended audience of the framework

The Common European Framework initiate a dynamic convergence of the ongoing work in the different European countries on teachers' professional profile in ICT for education. Supporting a change of focus from teaching to learning, the CEF also aims at facilitating the harmonizing of learning contents and methods in teacher education and fostering the sharing of common visions on pedagogical issues and solutions at the European level.

The framework adopts the broad view on the educational system, seen in interaction with the environment. It focuses on a clear understanding of the teachers' professional profile en Europe, in particular, the teachers' professional profile in ICT. Teachers are seen as an element absolutely crucial to promote quality of European educational and training systems and to bring about innovation: it is teachers who can articulate a vision both of the nature of learning and of the learning classroom. With the "Common framework for Europe" differences are not discarded. On the contrary, the authors refuse the concept of "global culture determined by technology and business" and recognise cultural differences shaped by natural forces and/or countless individuals. The individual has a central role in the programme: his/her values, abilities to adapt to the changing environments, his/her ethical principles compose the basis upon which the ICT literacy will be built.

The relationship between educational systems and needs of the economic world of work are not mentioned in the presentation which concentrates on changing mentalities inside of schools. More important than the idea of an information society, is the concept of *knowledge society* within which the school is immerged. It is to deal with this new context that every student and teacher must be prepared. One can presume that changing the educational system is the real target of this framework, a change which will be achieve by the teachers practice, specifically the activities of *learning* (with a learner-centred approach based on active pedagogy, cooperative learning environments, interdisciplinary domains of knowledge), and teaching (with revisiting and adapting of teachers' role by integrating ICT in their daily practice).

2) Visions and objectives: What is the rationale of the framework? What are its aims and intentions?

More than training teachers for a set of specific IT skills/abilities, technical abilities or even critical thinking skills, the program intends to bring about *changes in attitudes, values, beliefs and an emotional commitment* so as to empower teachers for their own professional

development, for the welfare of the students, for dealing critically with the educational organisation where they work, and also with the educational system and the whole environment. Within the context of a *knowledge society* instead of an *information society*, the challenge becomes the evolution of *teacher's personal and professional values*. A teacher, by interacting with different spheres of society and critically reflecting on his/her own pedagogical practice and on the environment, must became more aware about the his/her role in this new society. This means improving the role with new competences, skills and abilities (identified by him/herself through critical reflection on his/her practice). The teacher will be able to integrate consciously ICT into his/her practice and will promote appropriate innovation in it.

The framework's main characteristic is to propose an innovative and stimulating presentation of all these dimensions for introducing change in schools through ICT. The CEF structure is presented through a matrix form articulating an axis of communication in interaction with an axis of eight sectors of teachers' professional activities. In this way, the framework creates the conditions for *systematic reflection, by themselves and* conducted with peers, *of the teachers' own practice*. The professional "is set" in a very dynamic and interactive context, supposing in one side, an axe of **communication** concretised by a complex web of interactions (between the teachers and his/herself, students, colleagues and environment) and, the other side, the **sectors or domains** concretised by eight areas as pedagogy, curriculum/subject matter, professional development, organisation, policies strategies, ethics, innovation and technical aspects. See at the end of this paper, the graphical presentation of the matrix, excerpt from: *A Common European Framework for teachers' Professional Profile in ICT for Education*, (page 19).

An iris circular form provides a more effective presentation, (especially the online version) in order to highlight the dynamic aspects and network of relationships that organise these domains and communication levels in a real situation or context. See the Iris graphic at the end of this paper, excerpt from, *A Common European Framework for teachers' Professional Profile in ICT for Education*. (p.21)

Some differences between this framework and the others can be detected:

1)   The framework develops a profile which is a goal to reach, but in fact, as this goal is in reality beyond the teachers present capacities, it becomes an ultimate quest. In the midst is the professional identity of the teacher, beyond the technological skills that he/she must develop, mobilised on the very different and important levels that the matrix brings forth. Other frameworks address these changes, but the CEF targets deep changes in the professional as a person living in the knowledge society.

2)   The inclusion of the subject Ethics as a specific theme having the same level of importance as the technology or the curriculum/subject matters. The framework brings into the light of the daily professional practices of teachers many important issues that are usually left behind or put aside: specific themes such as authors' rights, intellectual property and plagiarism, netiquette, and in a widely point of view, moral dilemmas and perils of free time Internet communications, ethical, cultural and societal issues related to technology, the responsible use of technology systems or the development of a positive attitude towards technology uses for supporting life long learning, collaboration, personal pursuits and productivity.

3) Basic components of the digital educational practices:

◆ **Learning and teaching processes**

Is there a "learning process model", or "learning paradigm" which support the framework?

The constructivist paradigm is at the heart of the framework, which focuses on *the teachers actions towards their students*. There is an explicit will to bring about change in the teacher's mind. Learning must replace the traditional paradigm of knowledge-transmission as the dominant focus in teachers' practices, allowing the students to built/construct knowledge instead of accumulating pieces of information in memory.

Working within this pedagogical paradigm, the teachers could be able to propose pedagogical activities, meaningful for students and, if possible, to develop pedagogical activities and methods using tools which the students are familiar with. The concept of *disruptive innovation* is presented in the last chapter to introduce the idea of using technologies which are supposed to be attractive to young people and potentially rich in pedagogical aspects like blogs, ipodding and mobile phone/mobile device technologies.

But what is the learning paradigm underneath this framework to ensure the teachers' development? It seems articulate two mains ideas:

1) The use of ICT in real pedagogical situations "leads to a change in working patterns, with students becoming more independent. (p. 91)", or "The teacher operating in the digital age becomes aware of the impact of ICT on her practice, on educational system and on the classroom, and wants to improve her professionalism by means of systematic use of ICT in her practice (p. 88)". These two citations can show that the pattern *"learning by doing" is underneath in the framework*. But, just practice isn't enough for raising a deep changing;

2) The teacher must *reflect upon the experience, find documentation, improves his/her knowledge/information* and use theses data to be more aware, critical, analyst, sensible when reflecting upon the ICT's experiences. Not only sharing the ideas with written supports, but also *create the conditions to exchange ideas, good practices, experiences with colleagues within the school or outside it.*

◆ **What is meant by digital divide? What are the researches on which it is based?**

The concept of digital divide is not exposed as usual: there's no a complete definition about the concept, and questions like *access to the hardware or to the training in IT or technical skills* are not clearly developed as a rational to implement ICT in the educational practice. However, the idea of cultural differences that enables different communities to accept, integrate, improve *changing in the pedagogical practice and include ICT in their practice are underlined and, most of this, accepted as a fact that the society have to deal with.* This means that the ideas of *different levels* of skills, competencies, abilities to deal with ICT technology or even *access* to different amounts of information (variety, richness, quality, etc.) are truly underneath in this framework. However, instead of work in focusing strictly the gaps and trying to fill them up, the idea seems to be recognise these differences, accept them for being able to work together, planning tasks that could be resolved by these students with theirs actual skills and gradually creating a context which would help them to grow up. In different parts of the framework the expression "digital divide" is employed, and the meaning of "catch up it" and "bridge it" is used. The chapter where the subject Ethics is concerned gathers many allusions about this concept.

◆ **What is meant by "digital literacy"? media literacy, information literacy, e-literacy?**

None of these concepts are clearly developed in the framework.

Digital literacy is defined by the ability to use digital technology, communication tools or network in order to locate, evaluate, use and create information. This concept is defined in a particular chapter of the framework, named "Technology". Others characteristics can be added at this definition: the teacher digital literate is aware of the potentialities offered by the

ICT, he/she reflects about the use of the ICT in learning process and, as a result, he/she can implements them when preparing learning environments in order to satisfy some particular teacher's needs. The teacher must also be competent in screening some students' ICT skills to be able to decide which ICT application would be more adequate and relevant.

♦ **Curriculum content: have skills, competencies, higher order thinking skills been identified? Knowledge?**

Teachers' ICT skills are defined at three levels in the chapter "Technology":

a) Handling the technology,

b) Understanding the technology

c) Reflecting upon the technology.

Once in front of the variety of ICT tools related to the educational use, the teacher must be competent to identify the relevant tool for the pedagogical activity within which he/she is working. However, some tools are identified as fundamentals to produce text, images, simulations and monitoring; or the ones for calculation, making layout/designs, for preparing presentations and communication. Virtual learning environments (VLE), and learning Management Systems (LMS) are also included in this list.

Others *cognitive competencies* are suggested all through the framework but clearly indicated in the chapter *Professional Development*: placing value in critical thinking and self-directed learning as habits of mind. Without these competencies, the framework can not achieve success.

In parallel at these skills, some others *personal competencies* organized in sorts of layers are highlighted, named *personal and professional values*. They cover concepts like *degree of humanity and morality, practically and liberal sensitivity, logical reasoning, general sensibility and ethical principles*. Theses values would be applied in different spheres of communication, with the self, with students, with colleagues and with the environment. There are also another group of key *attributes*, qualities of individual's character that enables the professional to perform a job effectively. These are identified by the *competence of to adapt to change, to be flexible, intuitive, innovative and persistent, to be highly collaborative, having a good personal skills to communicate and to create context for communication*. All of these factors are related to the professional profile, but there are some key attributes specific for *dealing with ICT in education such as: systematic and well organised, creative and imaginative, effective communicator and team person and be innovative*.

Some researches are indicated in the bibliography, as for instance Ropp (1998, *A new approach to supporting reflective, self-regulated computer learning*) that leads us to Phelps and Graham (2004, *Teachers and ICT: exploring a metacognitive approach to professional development*), that emphasises the concepts of reflective practice and metacognitive practice, both easily identified in the framework. However, the second research underlines specifically the importance of accompanying and supporting teachers in their actions. This important kind of help is not identified as a tool in the framework.

4) Strategies: How is the framework to be implemented? is there a toolkit to be used?

Two kinds of supports have been produced: a book and an hypermedia. The methodology is centred on the idea of "learning by doing for using it here and now". Even if the shape of an iris has been indicated in the framework in order to suggest a dynamic interaction of these fields, a matrix shape is also presented, and it results in thirty-two cells, which are presented separately in the framework to concretise the programme (chapters in the book).

The support (the book, for instance) is organized by the domains as different chapters (pedagogy, curriculum/subject matter, organisation, technology, professional development, ethics, policy and innovation) and inside each chapter, the four levels of communication (self, pupils, colleagues and environment) are treated. Inside each level, four themes are presented: the context of actions related to the practice, the actions related to this practice, knowledge areas related to the activities involved in this practice and references. The nature of the discourse is quite "practical", as the titles let guess, and it's supposed that by using the supports, the teachers will have de directions to follow leading them to implement ICT into their real pedagogical practice, and achieve the aim proposed in the "lesson". The teacher is invited to reflect, to find and read articles, books, to build a net of communications, etc, in order to develop his/her professional profile. Some chapters like 'Organisation' or 'Policy' take into account the institution, trying to create the conditions for a deep commitment from the educational system to ensure the teachers' actions have enduring results. But the paradox is that the discourse is always directed at the teacher, who is asked to find colleagues, to compose a team and then they are "challenged" to work together in order to build this new pedagogical context. It's possible to deduce that the real challenge is to invite the teacher to be:

1) deeply informed about scientific results/ideas about the centred-learner paradigm;

2) aware about the real conditions inside the educational institution where he/she works;

3) able to build (alone or, better, in a team) a pedagogical proposition to be implemented in his/her own classroom;

4) able to present successfully this proposition to the institution and obtain the conditions needed to apply it.

It's clear that if the teacher is able to go through all these steps, he/she is ready to make some deep transformations in the educational system. However, the aim of the framework is exactly to obtain this mentality change! How does one get there? There's no indication in the papers of an accompanying by personnel required by the framework, or other kind of help to ensure this process. Instead, a variety of sources of information are suggested: educational literature, Internet, educational data bases and any other source identified by the teacher him/herself. By using theses resources and having in mind a goal to reach (for instance, to built a "learning environment" with the students), the teacher (and the students), would develop the different skills needed for their work and their development. It seems that the educational institution interested would implement the programme by itself and compose it (develop the program, choese the tools, etc) taking in account the characteristics and context of the institution.

Another paradoxal point: in one hand, inside some chapters like for instance *Technology*, the teacher's profile to deal with ICT is very complex at the technological level: *"The teacher masters a number of different communication forms and tools such as VLEs, LMSs, e-mail, sms, chat, newsgroups, webcam, video chat, intranet, private conferences and open conferences. She understands the differences between the tools and is able to select and suggest the appropriate communication form in any given context (p.94)"* A teacher who has just begun to take part in a deep change like this will certainly be afraid of this proposition. However, on the other hand, it's not indicated in the framework how the teacher becames a "master". This confirms the directions pointed out at the beginning of the framework: the "future teacher's profile in ICT educational context is an aim to achieve", a target to reach step by step, leading to someone who can use the technologies in his/her pedagogical activities in a conscious and aware way, not only relating them inside the school, but articulating them with the environment (family, social partners, etc.) within the educational process. Plus, he/she always has in mind a group of *social and ethical values* that give a sense to the action of *teaching-learning and living in a knowledge society*.

5) Evaluation of the framework: what has been planned, realised?

There's no information that this framework has been implemented and an evaluation already planned.

6) Further reading for an augmented understanding:

Midore, Vittorio, edited by, (2005) A Common European Framework for Teachers' Professional Profile in ICT for Education, Edizioni Menabo, Ortona. http://ulearn.itd.ge.cnr.it/uteacher/ (Accessed on May 2nd 2006.)

Midore, Vittorio, edited by, (2004) European Teachers' Towards The Knowledge Society, , Edizioni Menabo, Ortona. http://www.univirtual.it/uteacher/devepro/framework_books.htm (Accessed on May the 2nd 2006).
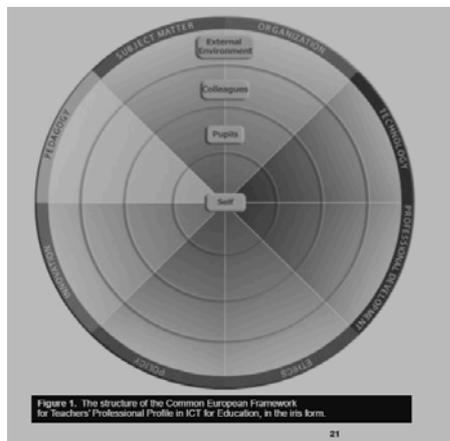
Midoro, V. & Martin, A., (2005), "Building a Common European Framework for Teachers' Professional Profiles in ICT for Education" in V. Midoro (ed) A Common European Framework for Teachers' Professional Profile in ICT for Education Ortona (Italy) Edizioni Menabò pp. 10-22

Phelps, Renata & Graham, Anne, (2004) "Teachers and ICT: Exploring a metacognitive approach to professional development, Australasian Journal of Educational Technology, Voc. 20, N° 1, p.49-68. http://www.ascilite.org.au/ajet/ajet20/phelps.html

Ropp, Margaret M., (1998) "A new approach to supprting reflective,selfregulated computer learning", Paper presented at SITE 98,College of Education, University of Houston. (Accessed 2nd of May 2006. http://www.educ.msu.edu/hopempages/opp/SITE/SITE.html

UTEACHER project (2004) "A Common European Framework for Teachers' Professional Profile in ICT: Participants' views on prospects & actions for acceptance and adoption in the national contexts". Venice International Seminar, 4th- 9th October 2004

http://ulearn.itd.ge.cnr.it/uteacher/docs/Venice%20seminar%20materials/day5/framework%20take%20up.doc (Accessed on May 2nd 2006.)

Figure 1. The structure of the Common European Framework for Teachers' Professional Profile in ICT for Education, in the iris form.

INTERACTION WITH SECTORS	SELF *Continuous personal construction of professional identity*	PUPILS *Facilitation of students' learning and development*	COLLEAGUES *Cooperation at school level and within teacher' community of practice*	ENVIRONMENT *Interaction with the external environment*
PEDAGOGY	Becoming aware of the constant impact of ICT on learning, school and society, and constructing a personal vision/philosophy of learning and pedagogy suitable for a knowledge society.	Developing and managing learning environments consonant both with one's personal vision of learning/pedagogy and with the demands and challenges of the knowledge society.	Sharing practice, repertoire, and learning/pedagogy visions. Collaborating in interdisciplinary educational activities.	Considering and using the local and global environment as a resource and as an arena for school and learning.
CURRICULUM/ SUBJECT MATTER	Given the rapid growth in knowledge, reflecting on the key areas and topics to address within the subject area; understanding the impact of ICT on the didactics of the discipline.	Designing and managing learning environments which take into account the opportunities and limits of ICT in the didactics of a given subject area.	Sharing practice, repertoire, and "know how" in uses of ICT in the subject area, both with colleagues and inside the teaching community.	Using local and global resources to foster learning in a given subject area.
ORGANISATION	Constructing a personal vision of school organisation that responds to the demands and challenges of the knowledge society.	Within the limits of context constrains, implementing an organisation of the school/classroom that responds to the demands and challenges of the knowledge society.	Sharing practice, repertoire, and organisational visions and cooperating with colleagues on classroom and school organisation.	Contributing to build a school organisation linked to the local and global environment.
TECHNOLOGY	Constantly pursuing technical and cognitive proficiency.	Getting the right ICT blend to facilitate students' learning.	Using technology to interact with colleagues and participate in teachers' communities of practice.	Using technology to create learning networks, bringing added value to school and society (locally and globally).
PROFESSIONAL DEVELOPMENT	Becoming aware of the increasing need for continuous professional development and the means to achieve it.	Planning and taking actions to develop one's professionalism regarding the education and welfare of students.	Learning to exploit ICT to cooperate with colleagues and the teaching community.	Identifying and exploiting the opportunities offered by the local and global environment to develop one's professionalism.
ETHICS	Making one's prime responsibility the education and welfare of all the students in one's care and accepting ICT as important for creating a knowledge society.	Gearing one's practice to the principle that the education and welfare of all the students in one's care is one's prime responsibility.	Playing a positive and active role in cooperating with colleagues and interacting inside teachers' communities of practice using ICT tools and resources in an appropriate way.	Recognising responsibility to prepare citizens able to live in harmony with the social and physical environment
POLICY	Critically reflecting on ICT policies and strategies pertaining to the school-ICT-knowledge society relationship and constructing one's personal vision.	Given context constrains and policy/strategy requirements, implementing actions that respond to the demands and challenges of the ICT policies of school and environment.	Critically reflecting with colleagues on policies and strategies pertaining to the impact of ICT on the school system and cooperating to implement and evaluate them.	Given the limits of one's action, contributing to the development of policies and strategies related to the construction of a school strictly linked to the environment.
INNOVATION	Critically engage with the need for ICT-led innovation and the transformative power of positive change.	Shaping and re-shaping ICT-led change in terms of the learning & teaching we provide.	Working with colleagues to introduce and develop innovative uses of ICT in schools and teachers' wider practice communities.	Contributing to building a culture of informed education change beyond the school; at regional, national and supra-national level.

Table 1. The structure of the Common European Framework
for Teachers' Professional Profile in ICT for Education, in the matrix form.

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http://www.univirtual.it/uteacher/framework/framework_map.htm

FRENCH TICE FRAMEWORK

Introductory information:

The French Ministry of Education and Research (MENESR) is in charge since November 2002, within the French government, of the development of information and communication technologies in education (TICE) as well as for the general public. It also has a central role in the policy for the development of Internet. The policies and programmes concerning education (schools and higher education) have been made public on a specific website (http://tice.education.fr/educnet/Public/plan/). Five important programmes implement the ICT policies in education. They are 1) infrastructure and services, 2) digital resources, 3) uses of ICT in teaching, 4) "Training for ICT and accompanying support and measures" and 5) Quality, technology monitoring and diffusion. The analysis presented here will focus mainly on programmes 2, 3 and 4.

1) Context, scope and intended audience of the framework

These three programmes (2, 3, 4) cover all levels of schooling and higher education as well as the training of teachers. Mastering the basic information and communication technology is now included in the core knowledge and skills considered as absolutely essential during French compulsory schooling (up to age 16). Building on existing ICT knowledge and skills frameworks, the French Ministry of education has developed its own certifications for students and teachers. ICT Certification in primary and secondary schools is obligatory and more and more integrated within existing curriculum. Equivalent certificates (PIM Passeport pour l'Internet et le Multimédia; CNI, Certificat Naviguer sur Internet) can be obtained free of charge by any person through the "Public Digital Spaces / Réseau des Espaces Publics Numériques" or through several other local centres and licensed training organisations. This results from an official strategy aimed at providing everyone with a minimum level of digital literacy competence.

2) Visions and objectives: What is the rationale of the French TICE framework? What are the aims and intentions?

The integration of ICT in all educational and training programmes is part of a larger 2002 government plan, ReSo2007 For a digital Republic in an information Society, (http ://www.internet.gouv.fr/informations/information/plan_reso2007/) whose aim is to overcome the digital divide and bring France to the forefront of countries digitally ahead. The basic rationale, as expressed on government web sites, is "the development in French society of the perspectives adopted by European Union (Lisbon, 2000). On the economic level, IC technology is the guarantee of a greater productivity and a greater reactivity. On the cultural and educational level, it brings the promise of a society where access to culture, knowledge and information will be easier and more largely shared, while assuring a decisive role in consolidating cultural, artistic and intellectual influence. Finally on the political level, ICT is an extraordinary means to break down walls and establish new relationships between the citizen and administrations or elected representatives."

The objectives are presented at a very ambitious level: "The challenge of a general use of ICT is the evolution of our values in a new world. French people must be endowed with the keys necessary for a critical understanding of a new culture. They must also have the opportunity to master these tools, which already form the basis of our economy, and which, through networking, are changing the social fabric by introducing new interconnection patterns."

However, the strategy deployed and the actions carried out are basically situated at a practical and technological level, ensuring the availability of infrastructures, of hardware, of courseware and digital resources, and the mastery of the ICT tools. Two types of certificates cover the whole range of persons to be trained:

1) B2i (Brevet Informatique et Internet) subdivided in three levels: level 1 is the competences to be acquired in primary school, level 2 is for junior high school (college) and level 3 is for senior high school (lycée). This training deals mainly with mastering the basics of digital tools.

2) C2i (Certificat Informatique et Internet) subdivided in two levels: level 1 is for university student with competences to be acquired during the first three university years and level 2 which is for teachers (primary and secondary schools) with competences to be acquired during the teacher training cycle (IUFM, Institut Universitaire de Formation des Maîtres). Specialized versions of the C2i have begun to appear, such as the C2i level 2 for the "profession of law" which includes the mastery of the ICT competences necessary for working in that profession.

3) Basic components of the digital educational practices

♦ Is there a "learning process model" or "learning paradigm" which support the framework?

If the French school system is dominated by a transmissive and curriculum approach, many conflicting pedagogical practices coexist within the system. Basically centred on teaching and the curriculum, the dominant approach does not leave much possibility for a student centred approach, not for active discovery, due among other aspects to the number of students per class.

The main aim of the ICT policies, as presented in the documents and programmes, is to fight against the existing digital divide, to assure equal chances to all citizens and to bring France to the level of the most advanced nations in the integration of digital technology. However this notion is not specifically explained.

♦ What is meant by "digital literacy"? or ICT literacy, media literacy, information literacy, e-literacy?

The framework does not develop what it understands by mastery of digital tools. It stresses the need to integrate ICT in education as a factor of competitiveness and a powerful lever for economic growth and employment. What mastering the tools means is contained in the "curriculum", which is very detailed and specific, associated with each certificate.

There are specific curriculum that have been designed: the B2i (Brevet informatique et internet) for high school students, the C2i (Certificat informatique et internet) for university students and the C2i niveau 2 « Enseignant » for teachers.

The basic certification, the B2i, is progressive from primary school to senior high school. It deals with the basic operational skills needed to use a computer, word processing, spreadsheets, email and navigating on the Internet, and with a set of specific skills to deal with information. These skills had been identified in the eighties and several referentials have been produced, in an effort to develop in students some of the skills and knowledge of documentation workers (librarians, researchers, archivists). Since the implementation of data bases, librarians have been trying to get students to become familiar with the specialized languages and operations involved in querying organized information. These skills (five to eight depending on how they are presented) consist of

- identifying needs, objectives and goals,

- developing strategies for information research,

- locating, accessing and acquiring information,

- analysing, organising, processing and synthesizing information,

- using, presenting and communicating information,

- evaluating information produced.

The decision to develop the B2i in 2000 was diversely accepted by the teachers. Those who were most enthusiastic and who participated fully were a majority of technology teachers. ICT was already part of their curriculum and they actively help set up the new plan of action which included many innovative elements, such as certifying procedures without exams, tests and formal assessments but through re-investing skills and knowledge in disciplinary activities. However the important work done by the librarians and documentalists does not seem to be integrated in the B2i approach. The one element that is developed is training for a socially aware and critical attitude towards information. But basically, B2i is about mastering technological tools and becoming familiar with the digital universe.

The content of the training can be summarized as follows:**B2i ® School (niveau1) : Framework of competences**
5 units of competences
1. Master the basics of computer technology.
2. Adopt a socially aware attitude with information transmitted through digital tools.
3. Produce, create, modify and exploit a document with a word processing tool.
4. Conduct researches and find the needed information in digital multimedia documents: CDRom, DVD, websites, data bases.
5. Communicate with email software.

B2i ® Junior high school (niveau 2) : Framework of competences
5 units of competences
1. Organise digital processing with a spreadsheet.
2. Produce, create and exploit a document.
3. Find information and documentation.
4. Process and organise information
5. Communicate with email software.

B2i ® Senior high school (niveau 3) : Framework of competences
4 units of competences
1. The B2i college competences
2. Use a digital workspace
3. Use ICT with social awareness
4. Acquire, transform and produce information.

The other level, the C2i (Certificat Internet et Informatique) is more focused on the mastery of ICT tools as part of the competences required for successful higher education studies. Here the integration with information research competences is fully attained, as can be understood with the following list of competences with the C2i includes:

- searching, creating, manipulating and managing information,

- acquiring and processing data,

- managing data,

- saving, archiving and searching data,

- oral and distant presentation of information produced,

- distance exchanging and communicating,

- collaborative working,

- critically coping with the stakes and challenges of the use of ICT: rights and obligations, legal, professional and ethical issues.

4) Strategies: How is the framework to be implemented? Is there a toolkit to be used?

Four main programmes are being developed that all contribute to the integration of ICT in schools and educational institutions.

For **training**, there here have been progressive steps since 2000 when the B2i first came into existence

CNI ou NSI Certificat de Navigation Internet ou Naviguer Sur Internet (fin 2000)	Ministère de l'emploi Tous publics AFPA, APP,Demandeurs d'emploi
PIM : Passeport pour l'Internet et le Multimédia (fin 2000)	DUI (Délégation aux usages de l'internet) pour le réseau des EPN (espaces publics numériques) officiellement labellisés Pour le Grand public
B2i: Brevet Informatique et Internet (niveaux 1, 2 et 3) (Nov 2000)	Ministère de l'éducation nationale de l'enseignement supérieur et de la Recherche
B2i FC (Formation continue) GRETA (Juillet 2001)	Ministère de l'éducation nationale de l'enseignement supérieur et de la Recherche
C2i : Certificat Informatique et Internet (niveau 1) (Mai 2002)	Ministère de l'éducation nationale de l'enseignement supérieur et de la Recherche
DEFI : Démarche D'Évaluation du Fonctionnaire Internaute (2003)	Ministère de la fonction publique. Agents publics
C2i : Certificat Informatique et Internet (niveau 2 Enseignant) (Mars 2004)	Ministère de l'éducation nationale de l'enseignement supérieur et de la Recherche
C2i : Certificat Informatique et Internet (niveau 2 "Métiers du droit") (Juin 2004)	Ministère de l'éducation nationale de l'enseignement supérieur et de la Recherche
C2i : Certificat Informatique et Internet (niveau 2 "Métiers de la santé") (Juillet 2005)	Ministère de l'éducation nationale de l'enseignement supérieur et de la Recherche

These different certificates are part of a larger strategy that includes, besides training, infrastructure, services and resources. The programme "**Infrastructures and services**" offers the work environment needed to optimize the use of digital resources and services available. Portals, virtual desktops, private office, are some of the metaphors used to describe the unique entry point that more and more institutions are offering to each student and each teacher. This means collaborating internally with office and management computing and externally with local authorities that contribute to the development of infrastructures and tools made available to schools and institutions. One interesting feature is that the government proceeds through experimentation with a small number of establishments and then generalizes the measure, after evaluation and integration of improvements.

For resources, several lines of action are being developed, with a mixture of bottom-up and top-down strategies. With SCHENE (Schéma de l'édition numérique pour l'enseignement) local production initiatives are being stimulated and a general listing of needs and existing production is being produced, with schemas for organising exchanges and sharing of resources. There is also a certificating process for published resources that can receive an official label (R.I.P. Reconnaissance d'intérêt pédagogique) certifying their pedagogical quality. A global digital knowledge space (ENS Espace Numérique des Savoirs) has been organized for high schools, with the rights for resources under copyright (from museums, the press, archives, etc) having been bought by the Ministry. Furthermore quality resources and best practices are being identified through common repositories such as PrimTICE for Primary school,

5) Evaluation of the framework: Does it work?

Evaluation reports are coming out regularly to help the Ministry go from experimentation to full implementation. Outside teams are conducting surveys and examining the evolution of educational practices in the light of changes introduced. The different lines of action are developing at different rhythms, depending on the Ministry and school leaders within the schools.

Statistical studies such as "l'Enquête ETIC" are available for appreciation of the integration of ICT in education through indicators such as number of students per computer, number of computer per school, number of school offering digital management information, etc.

http://tice.education.fr/educnet/Public/plan/politique/edutheme_print?doc=etic

6) Results or outcomes: Are there operational results such as grids, curriculum, toolkits, guidelines, applied or applicable learning models?

There are many practical tools that are available on web sites and that are continuously upgraded and updated. These are produced for each type of educational entity, within the administrative structures that are very centralized and very procedural in France.

TECHNOPEDAGOGICAL COMPETENCE FRAMEWORK FOR TEACHERS. (RÉFÉRENTIEL DE COMPETENCES TECHNOPÉDAGOGIQUES POUR LE PERSONNEL ENSEIGNANT.) QUÉBEC, CANADA.

Introductory information

This framework was produced by two educational researchers and counsellors for a network of college teachers. The main objectives were:

◊ To ensure broad guidance for reflection and training in terms of competence, allowing teachers to improve the pedagogical use of ICTs. More a source of inspiration that for prescription;

◊ Facilitate the analysis of needs in professional development and provide training in four domains: communication, information, design, production;

◊ Produce a tool for reflection and exchange on an articulated problematic of pedagogy and ICTs that goes beyond simply providing a curriculum.

The content of the framework results from the study of the existing ICT competence framework, interviews of ICT teacher trainers and the study of course scenarios. The French word "Référentiel" is based on the idea of a structured system that will serve as guide in the integration of ICTs in a conscious pedagogical practice.

http://site.profweb.qc.ca/index.php?id=96 (Accessed May 2nd 2006)

http://ntic.org/guider/referentiel.pdf (Accessed May 2nd 2006)

1) Context, scope and intended audience of the framework

Integration of ICTs in education is stated as a fact and as an imperative in the evolution of professional practices. Before the question that needed to be answered was "why integrate ICTs in education?", today the question is "how?". The authors want to redefine the necessary competences, not from a technological point of view but from within a pedagogical approach. They point to changes in the pedagogical role and tasks of teachers and present new, more specialised roles. These, to be developed by teachers that have more technological competence, concern the design of pedagogical resources (designers, content experts, technological specialists or teachers knowledgeable in project management).

The framework is completely focused on teaching practices, even if the ultimate aim is to prepare students for the information society. Teachers need to personally engage in the development of the techno-pedagogical competences and thus have access to the new pedagogical possibilities that ICTs can offer. What are the most effective pedagogical use of ICTs and what are the needed competences to use ICTs at their best in pedagogy: these are two dimensions that are addressed here, even though the authors are aware that there are also epistemological and ethical questions, understood within the learning context rather than on a more social and cultural level or beyond the school walls.

2) 2. Vision and objectives: What is the rationale of the techno-pedagogical framework? What are its aims and intentions?

The main objective of the techno-pedagogical framework is to contribute to the development of the capacity to exploit ICTs in a pedagogical context. By capacity is meant here an integrating competence. Concretely, the framework presents itself as

- A guide to what is desirable in terms of competences to be mastered, without however giving a definite list of competences, standards, or performance criteria to be acquired;

- A context to animate and orient reflection, starting with the analysis of ongoing practices of the college teacher, identifying what is already mastered, the level of ICT integration in a particular group of professionals and future possible directions.

- A series of landmarks to orient the organisation of specific training for each type of teachers.

Teachers are incited to to move from a teaching-centred lecture approach to a learning-centred socioconstructivist pedagogy. This orientation is present in the framework but is not one of the primary goals, rather it is a necessary evolution that will allow teachers to reflect on the pedagogical dimensions of teaching and learning in the world of today.

3) Basic components of the digital educational practices

The framework results from the study of seven different approaches to competences for ICT in education. Four broad domains of techno-pedagogical competences are derived and form the structure of the proposed framework: information processing, communication and collaboration, pedagogical design and production. The authors mainly stress the need to go beyond technological competences and skills and develop competences focussed on the pedagogical use of ICT.

◆ Is there a "learning process model", or "learning paradigm" which support the framework?

The learning paradigm indicated in the framework is the socio-constructivist one which states that the learning process is learner-centred, inserted in a social situation where the learner's knowledge is built by the learner himself, helped by social interactions (personal or mediated); the learning set is constructed by the teacher articulating this theory's orientation and the pedagogical potentialities of the TICE.

This socio-constructivist approach is not developed in the framework (which could help teachers to reflect about these concepts). The need for teachers to change learning paradigms to guide their pedagogical practice is not highlighted, as it is in many other frameworks. Instead, it's stated that the socio-constructivist paradigm is the one most suited with ICT potentialities in a learning context.

If the learning paradigm that is to guide the teachers in their professional practice with their students is clear, it's less obvious what the paradigm is for the teachers' training. The main idea seems to be "learning-by-doing", the teacher needs to practice, make some endeavour, reflect about it before, during and after a practical pedagogical activity.

♦ **What is meant by "digital literacy"? or ICT literacy media literacy, information literacy, e-literacy?**

Digital literacy is not a concept used by this Franco-Canadian approach. The work "literacy" also does not have a straight translation in French and it is only recently that the French language Commission has proposed a term recently created, "littérisme", to translate "literacy", leaving aside the existing use of "literacie" as not conforming to French language work construction rules.

The competencies for information processing, one out of the four domains, are conceptually referred to "computer literacy", basic technological or operational skills, and "information literacy", referring to teachers' (and students') aptitudes and capacities to exploit informational resources, and to extract data and content from the ICT sources. However the authors bring an additional content to these competencies with "epistemological competence" by which they include an organisational competence using the ICT possibilities to sustain and amplify cognitive processing and construction of knowledge. The competences for the other domains are not conceptually situated as regards existing frameworks, nor developed conceptually.

All the competencies for the four domains constitute a global competence labelled « integration competence » The competencies, as illustrated below, are activated in specific interlocked fields: educational community, learning community, curriculum, classroom. These fields of action are organised by the domains, themselves structured by two principal axes, information and communication on one hand and design and production on the other.
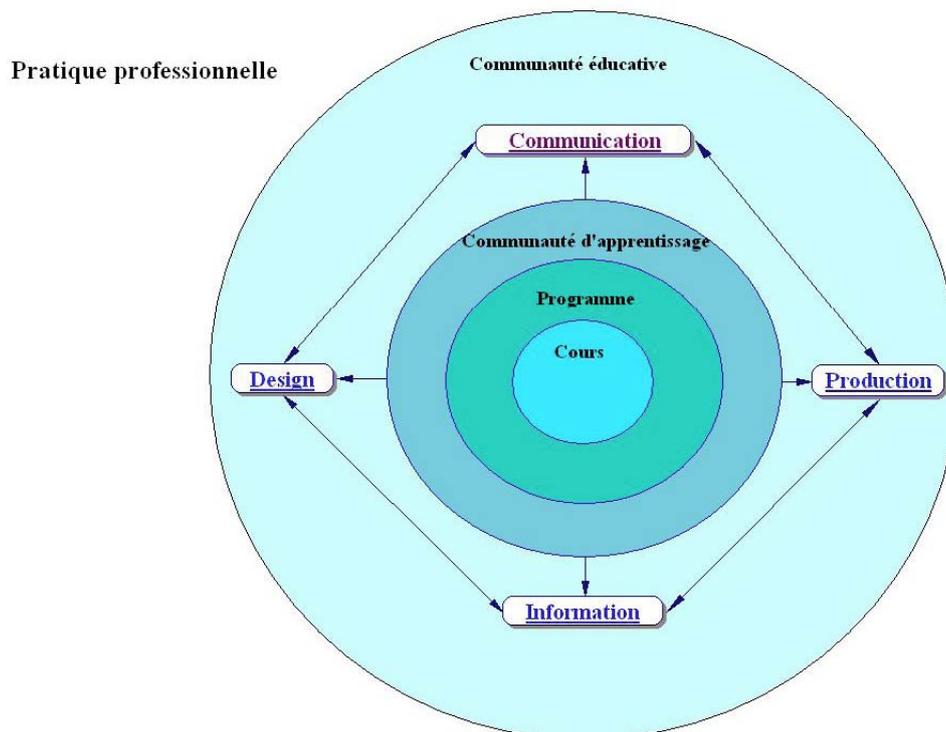

(Un référentiel de compétences technopédagogiques. P. 6)

The framework of competence is deployed within the teachers' professional practice, relying on their personal engagement, their responsibility for their own development and their pedagogical actions as education professionals. The social and ethical challenges are taken

into account at the level of their professional practice, as a consequence of the development of the integration competence.

The domains are detailed in the framework showing possible directions for pedagogical use of ICT integrated in the different fields. An example of the level of detail is presented in the pedagogical design domain.
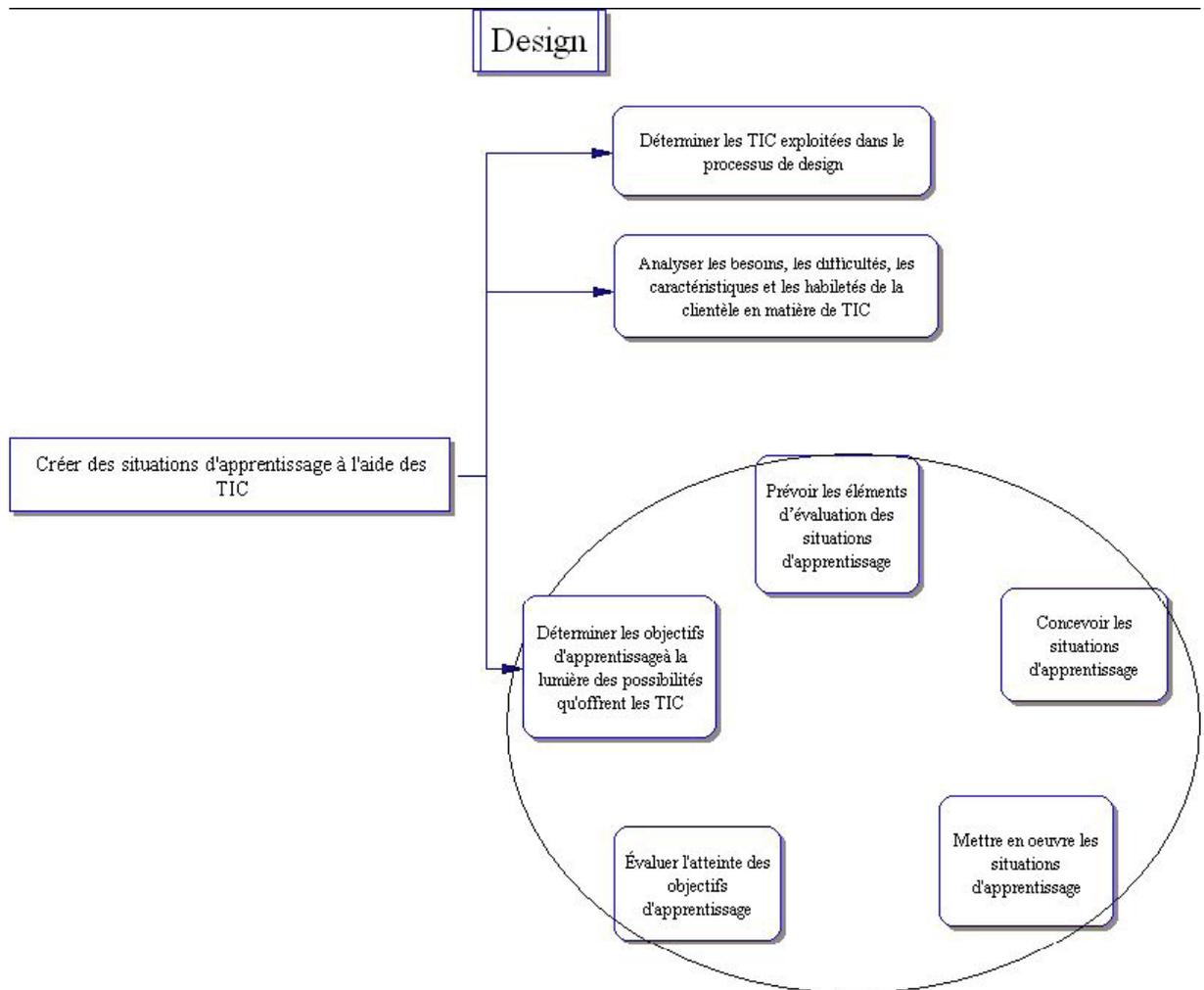
The analysis of the competencies in the domain of pedagogical design shows that to go through the actions in the boxes (identify the ICT exploited in the learning process, analyse the needs and difficulties of the users, etc) the three levels of techo-pedagogical competencies (operational, informational and epistemological) are needed.

4) Strategies : How is the framework to be implemented ?

There is no information on implementation. The aim of the framework is basically to provide directions, a few instruction on organising a training project, be it from an institutional or individual perspective.

5) Evaluation of the framework: what evaluation tasks have been planned, realised?

In 2004, the framework went through a double validation procedure.

- It was presented twice to a teacher network, PERFORMA ; all the local members proposed through a questionnaire comments and suggestions on the framework;

- The framework was presented during a workshop taking place within a conference of the Association Québecoise de pédagogie collégiale, and was largely accepted by the participants.

Finally, the authors completed their survey of recent ICT competence frameworks, thus confirming the basic choices that had been theirs. The validation procedures have all taken place within the specific community for which the framework was developed.

6) Results or outcomes: Are there operational results such as grids, curriculum, toolkits, guidelines, applied or applicable learning models?

This framework exists through two documents that are available on the web. They can be considered as tools for implementing the framework.

- One is a document posted in January 2006, produced by B. Poelhuber. It is a summary, in a very colloquial style, addressing teachers directly, of the different steps that teachers are invited to follow if they want to acquire the global integration competence.

- The other is the complete document presenting the research, inlcuding the literature survey, that resulted in the framework. The framework itself is presented in a more formal and conceptual style. In the annexes can be found all the tools used and also documents such as the French translation of NETS for Teachers or the PERORMA competence profile.