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## Teaching and Learning for an ICT Revolutionised Society

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### Purpose

This exercise was part of the EU FP7 Farhorizon Project which was aimed at piloting, developing and testing in real situations a foresight methodology designed to bring together key stakeholders to explore the longer term challenges that face their sector (or that cut across sectors) and to build a shared vision that could guide the development of the relevant European research agenda. This approach was applied to the theme “Teaching and Learning in an ICT Revolutionised Society”.

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### The Information Society

The development of information and communication technology (ICT) in the last decades doubtlessly ranks amongst the major revolutions in our ability to communicate and to manage information. Over the last three decades, ICT has become a prominent feature of our everyday lives. The development of the personal computer and office productivity software in the eighties led to the widespread adoption of such technology in the business world. Similarly, the introduction of the world-wide web in the nineties and the falling cost of hardware brought computing to the masses and has led to the personal computer becoming a commonplace item in the domestic environment.

The ICT revolution has resulted in a wealth of opportunity for increased competitiveness, innovative business models, government service delivery, new methods of learning and personal use. The European Commission has endeavoured to accelerate realisation of the benefits of ICT through a number of measures included in the i2010 Strategy (2005-2010) and more recently in the Digital Agenda 2020.

Despite significant progress, however, there exist numerous areas where the power of ICT has not been adequately exploited, and much remains to be done if Europe is to maintain its competitiveness and achieve its economic and social objectives. This initiative is based on the following rationales:

- the **social rationale** arises from the fact that knowledge and familiarity with ICT constitute an important dimension of employability and of general social participation;
- the **pedagogic rationale** emphasises the contribution that ICT can make to the improvement of the quality of education by providing rich and exciting environments for learning;
- the **vocational rationale** stresses the need of ICT learning and teaching for future professions where ICT will be utilised;
- the **economic rationale** relates to the potential for increasing efficiency and effectiveness in economic activities, together with opportunities for developing innovative products and services based on advances in information technology.



## The Success Scenario Approach

The “Success Scenario Approach” is an action-based approach where senior stakeholders develop a shared vision of what success in the area would look like, together with appropriate goals and indicators, which provide the starting point for developing a road-map to get there. The purpose of having such a vision of success is to set a ‘stretch target’ for all the stakeholders. The discussion and debate forming an integral part of the process leads to the development of mutual understanding and a common platform of knowledge that helps to align the actors for action.

In practice, the structure of a workshop begins with a consideration of key drivers or challenges, builds a vision of success, and then focuses on actions to make the vision a reality. The workshop helps flagging hidden bottlenecks and constraints that might impede progress and facilitates identifying windows of opportunity for joint policy coordination and action.

Important outcomes of these workshops are the insights they provide in terms of the level of maturity in policy design and development and the viability and robustness of long-term policy scenarios to guide policy-making. The workshops also provide indications on whether there is a need for further discussion to refine thinking and policy design and/or to bring additional stakeholders into the discussion.

## Information Society Requires ICT Literacy

The workshop participants articulated a vision of a Europe where future generations possess an adequate repertoire of skills and competences to enable them to participate actively in a digital society, both in their personal and in their professional lives.

### Need to Promote Widespread ICT Literacy

Most of the younger generation, the so called digital natives, have grown up using technology that has now become an integral part of their everyday lives. This has imparted an easy familiarity and a sense of confidence in its use and above all a willingness to make use of such technology without a second thought. Nevertheless, their experience is largely based on using the technology for social networking and entertainment while their skills are at best incomplete in terms of exploiting ICT in other settings and in their professional lives.

Similarly, the large-scale deployment of computers in business and industry over the last two decades resulted in significant segments of the workforce undergoing training or learning to use computers on the job. However, such training normally focused on specific applications rather than having a broad base of applicability, hereby limiting the ability of such individuals to fully exploit the potential of ICT.

During the workshop experts from the domains of education and ICT met with policy-makers and other stakeholders to explore a foresight vision of the contributions that ICT could make in the areas of education, business, industry and society. The workshop also aimed to identify what measures would be necessary to develop the required skills.

A number of meetings were held with the EU Commission’s Directorate General for Research & Innovation to establish the approach to be followed and to clarify the focus of the exercise. An initial description of the ecology was prepared as background for the workshop. The event was held in Brussels on 3 December, 2010 with the participation of 30 experts and policy-makers.

The first part of the workshop focused on setting the scene and establishing the need for revitalised and coherent policy governance. A second session aimed at developing a common vision of the role of education in equipping European citizens with the skills needed in the coming decades. The third session sought to identify the key policies and instruments needed to achieve the vision, while the fourth involved prioritisation of the policy recommendations resulting from the earlier sessions. The fifth and final session focused on assessing ways in which key groups can shape the pace and direction of education in Europe.

In spite of such business-driven learning, however, there still remains a significant sector of the working population which has not yet had the opportunity or taken the initiative to develop digital competencies, severely limiting their professional development and career options. Other sectors of the population, such as those not in active employment and the underprivileged, have had limited opportunity to learn to use ICT.

### ICT Must Become a Tool in Education

The level of utilisation of ICT as a tool in education remains low overall, and there is lack of a common approach across the EU as well as within individual countries. While most schools are now equipped with computers, Internet access and occasionally more sophisticated equipment such as interactive whiteboards, effective eLearning requires far more than the mere introduction of hardware in the classroom. In general, however, schools have failed to develop visions and strategies on the way they can integrate e-learning effectively throughout the curriculum and in the school environment.

Teacher training on the use and role of ICT in learning has not been adequately addressed, and exploitation of ICT by and large has been left up to the initiative of individual teachers. In most cases, school curricula have not been adequately updated to take into account the needs for developing ICT skills.



ICT offers the opportunity of a superior learning experience through the use of multimedia, specialised software and educational games. However, established textbook publishers have largely failed to embrace ICT and to develop teaching material incorporating simulations, games and other modern tools. Although much educational content has been developed, the lack of a recognised certification mechanism means that most educational institutions are unable to make use of this material. Some countries have recently embarked on the development of libraries of ICT material (Wikiwijs Netherlands, KlasCement Belgie).

### **Vision of a Europe Reaping the Benefits of ICT**

The workshop participants articulated a vision of a Europe where future generations possess an adequate repertoire of skills and competences to enable them to participate actively in a digital society, both in their personal as well as in their professional lives. European educational systems need to take advantage of improved learning mechanisms offered by ICT, and individuals must be able to manoeuvre safely in the virtual world whilst being creative and constructive contributors to society and to our economy. Europe must produce a cadre of workers who are able to leverage the power of ICT to enhance their productivity, to develop improved products and processes, and to reap social and economic benefits through the development of innovative solutions.

In order to achieve this vision, the following policy recommendations have been put forward.

#### **Crosscutting Policy Approach and Strong Education Initiative at EU Level**

The participants supported the idea of a high-level initiative driven by the European Commission and synergising policies of other policy domains, such as innovation and industrial policy. An analogy was drawn with the Commission's approach to innovation, a successful horizontal initiative cutting across several organisational structures. The education initiative must be moved to a prominent position on the political agenda and should be given a high profile and strongly promoted to raise awareness among the public and stakeholders at all levels. It must be underpinned by the development of a roadmap establishing targets and lines of action while emphasising the imperative rationales (economic, social and vocational) without discouraging pedagogically driven activities. Evidence-based policy development was also mentioned as one of the criteria. It was also suggested to promote the use of structural funds and other sources of funding, such as the European Competitiveness and Innovation Framework Programme, to finance the initiatives referred to above.

### **Society Called Upon to Ensure ICT Participation**

Most EU countries have introduced a number of campaigns and schemes aimed at improving the ICT skills of the elderly, the underprivileged and the marginalised. However, sustained effort for this target population is required and adequate opportunities should be made available for all members of society to have access to the Internet, to master the necessary skills, and to benefit from modern technological developments.

Participants discussed various approaches towards monitoring progress in the area of ICT in education and agreed that indicators currently in use need to be reexamined. For instance, the ratio of students to computers is not a meaningful metric on its own and needs to be supplemented with measures of frequency of use, teacher skills, and use of educational software amongst others. Monitoring of progress should be complemented by tools of trust including information on available instruments, good practice and success stories. Defining references for ICT competencies, in relation to the self-learning potential and ICT applications in society, for different levels and types of schools, subjects and disciplines, and in regard to future fields of employment was also supported.

Action is needed to stimulate national and international networks of stakeholders to unlock resources and to exchange experience and good practice between all stakeholders to include discussion of policies, foresight and research outcomes. Governments should work with hardware suppliers and use procurement power to stimulate the development of well-specified state of the art, schoolproof, low-cost hardware to enable each student to have his or her own tablet.

#### **Educational System Needs to Embrace ICT Literacy as a Key Objective**

The educational system plays a pivotal role in preparing future generations with the skills they need for a fulfilling career, including ICT. Despite some progress in educational systems towards meeting this goal, much remains to be done. The scale of change that is needed calls for a concerted effort to implement changes at various levels before the educational system can be deemed to have reached a satisfactory standard.

University training courses for new teachers urgently need to address the pedagogical dimension by including instruction in modern teaching methods, exploiting ICT hardware and software to provide a superior educational experience to students. This needs to be complemented with specialised courses for existing teachers in order to reach the entire teaching workforce.

There is a growing understanding that kids do not automatically attain the required skills. Curricula need to be updated and should include ICT literacy. ICT applications

should be integrated in subject and disciplinary learning, and opportunities for self-learning through the use of ICT should be promoted and exploited. Research and pilot studies need to be undertaken to obtain a better understanding of how teaching methods can be improved. Educational materials need to be digitalised and improved, and textbooks must be complemented by courseware based on rich multimedia and incorporating graphical simulation and educational games. Educational material providers need to engage in dialogue with schools and may require encouragement to invest in the development of such materials.

Networks of stakeholders (such as schoolnet) provide an opportunity for mutual learning and exchange of good practice, and such initiatives should be further encouraged and broadened to include discussion of policies, foresight and research outcomes.

At the higher education levels, ICT should be incorporated into other disciplines (e.g. medicine, social sciences) whenever possible. Students should be given greater freedom of choice in selecting study modules – this should promote creativity and allow students to build on their strengths.

#### **Encourage Employers to Qualify the Workforce**

While many workers have been trained or have developed computer skills on the job, there still remains a significant sector of the working population which has not yet had the opportunity or taken the initiative to develop digital competencies. This reduces their career prospects and negatively impacts the competitiveness of the workforce. Participants supported the lifelong learning paradigm and the idea that public and private employers should introduce programmes to enable their employees to develop the necessary competencies. One way to encourage this would be through the use of financial instruments such as tax incentives, subsidies and grant schemes funded by central government.

However, merely addressing digital literacy skills in individuals is not sufficient. ICT presents myriad opportunities for productivity gains and competitive advantages in business and industry, and a more elaborate approach is called for. Tailor-made, sector-specific workshops should be organised with the objective of enabling employees to discuss how ICT can contribute to innovation within their particular sphere.

#### **Inclusive Policies for All Members of Society**

The participants identified the need for specific schemes targeted at adults who are not in productive employment to catalyse them into embracing modern technology.

A favourable environment must be put in place to provide an opportunity for all members of society including the elderly, the underprivileged and the marginalised to form part of the information society. Sustained efforts to promote broadband and drive down the costs of computers and Internet access are needed to facilitate availability for those requiring it for their personal use. Free courses on basic use of computers and the Internet will also help.

These sectors may need special encouragement to help them overcome the initial apprehension of dealing with technology. Multipliers such as social workers, carers, and others who are in direct contact with these individuals can be instrumental in informing them about opportunities and encouraging uptake. These workers should be provided with specialised training in this area, and their institutions should be provided with the equipment needed. Creative solutions should be encouraged where institutions such as schools, libraries and local community houses are aligned to raise the level of ICT awareness and literacy in deprived regions and neighbourhoods.

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