> Foreword

The revitalised Lisbon strategy underlines the crucial role of education and training to Europe's future prosperity and social cohesion.

Beyond their broad mission to serve society as a whole, education and training systems are of particular importance in helping to deliver sustainable growth and creating more and better jobs. Over recent years, Member States have made significant progress in working together under the Education and Training 2010 work programme – the education and training component of the Lisbon strategy for jobs and growth – to modernise Europe's education and training systems to meet the demands of the knowledge-based economy and society.

Information and communication technologies have the potential to significantly advance our progress towards the Lisbon objectives. New open and flexible forms of ICT-supported learning (eLearning) are increasingly being used for the re-skilling of workers, and are opening the way to new forms of education and training for the knowledge society. Consequently, ICT is a cross-cutting theme in the new Lifelong Learning programme for the period 2007-2013, which aims to promote greater mobility and stronger links among education and training institutions.

The Commission's i2010 initiative, a European Information Society for Growth and Employment, takes on board this revised policy agenda. It highlights the opportunities and challenges of eLearning, its key role in creating knowledge and new innovative learning content and services, and the role of lifelong learning together with innovation and research in the triangle of knowledge. It also emphasises the growing need for digital literacy as an essential competence in the knowledge society and skills for the workplace.

Since their inception, EU programmes for ICT research and for ICT uptake have put emphasis on ICT for education and learning. This brochure presents the most recent innovations emerging from these programmes that are of relevance to education policy.

We welcome this brochure as an illustration of how innovation in ICT is contributing to a European policy for a learning society.

Viviane Reding

European Commissioner for
Information Society and Media

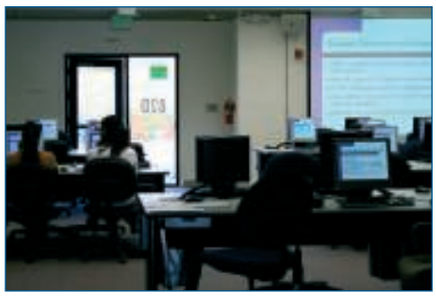
Ján Figel'

European Commissioner for Education,
Training, Culture and Multilingualism

> Challenges for Education and Training

Education is a primary concern in all European countries. It assumes particular importance in the context of the Lisbon strategy to boost EU growth: in the emerging knowledge-based economy success – both for individuals and for Europe as a whole depends crucially on realising human potential. Making this happen requires a fundamental transformation of education and training throughout Europe. This process of change is being carried out in each country according to national contexts and traditions and is being driven forward by co-operation between Member States at European level.

Although Member States invest significantly in education, we still have some way to go to ensure that opportunities are open to all. Almost 16% of young people in the EU still leave school early, often without any qualifications, and nearly 20% of 15 year-olds continue to have serious difficulty with reading literacy. Only about 77% of 18-24 year-olds complete upper secondary education – still far below the EU's target of 85% – and only 10% of adults aged 25-64 take part in lifelong learning. Moreover, there is little evidence of an increase in employers' investment in continuing training.



The role of traditional educational institutions – schools, colleges and universities – in educating younger generations has never been more important than it is today. To succeed in tomorrow's knowledge-based economy and society, we have to equip young people with the knowledge and skills necessary to cope with continuous change in their private and professional lives. They need not only the technical skills necessary to engage with the new technologies – so-called 'digital literacy' – but also the 'softer' skills such as creativity, problem-solving and team work.

Approaches to training are changing too. As the world of work becomes ever more complex and portfolio careers become the norm, barriers between work and learning are disappearing. Employees are moving in and out of work and between working tasks in a world where skills, disciplines and jobs mutate rapidly. Organisations require a flexible workforce with broad competencies and increasingly individuals are taking responsibility for their own professional development as part of their lifelong learning.

Hence, learning today is no longer confined to educational institutions, companies or training centres. New technologies and tools offer learners greater flexibility, easier access to information and the opportunity to match learning to their specific needs, circumstances and learning profile. The home is increasingly important as a learning environment. So too are other contexts, from prisons and community centres to care homes.

The boundaries of learning are changing all the time. Technological developments, such as the internet, mobile communications and virtual environments, create possibilities to support learning in new ways. In addition, our definitions of learning are changing, as we gain new insights into how people learn and what they need to learn to adapt to changing economic and social conditions.

> Education and Training Policy

To ensure their contribution to the Lisbon strategy, in 2001 Ministers of Education adopted a report on the future objectives of education and training systems in the EU, agreeing for the first time on shared objectives to be achieved by 2010. This resulted in a 10-year work programme, Education and Training 2010, approved by the European Council. These agreements constitute the EU strategic framework of co-operation in the fields of education and training, and are implemented through the open method of coordination.

Member States have agreed on three major goals to be achieved by 2010 for the benefit of citizens and the EU as a whole:

- to improve the quality and effectiveness of EU education and training systems;
- to ensure that they are accessible to all; and
- to open up European education and training to the wider world.

Actions to achieve these goals are based around specific objectives covering the various types and levels of education and training (formal, non-formal and informal) and aimed at making a reality of lifelong learning. Systems have to improve on all fronts: teacher training; basic skills; integration of ICTs; efficiency of investments; language learning; lifelong guidance; flexibility of the systems to make learning accessible to all; mobility; citizenship education, etc.

In the latest policy review, published as a Communication[1] in November 2005, the Commission calls for Member States to speed up the pace of reforms in education and training systems to avoid large proportions of the next generation facing social exclusion. To help achieve this, the Commission has set out what it sees as eight key competences every European citizen should have to prosper in a knowledge-based society and economy. These include the ability to communicate in foreign languages, basic competences in maths, science and technology, digital competence, and interpersonal and intercultural skills.

In a joint interim report with the Council, the Commission reported on the progress of the Education and Training 2010 work programme. National reforms are moving forward but there is too little progress against those benchmarks related most closely to social inclusion. The pace of reforms should be accelerated in order to ensure a more effective contribution to the Lisbon strategy and the strengthening of the European social model.

Education and Training 2010 integrates all actions in the fields of education and training at European level, including vocational education and training (the "Copenhagen process"). As well, the Bologna process, initiated in 1999 is crucial in the development of the European Higher Education Area. Both contribute actively to the achievement of the Lisbon objectives and are therefore closely linked to the Education and Training 2010 work programme.

[1] Modernising education and training: a vital contribution to prosperity and social cohesion in Europe, COM(2005) 549 final

> Where the Information Society meets Education

The crucial role of information and communication technologies (ICT) in building Europe's social and human capital is reflected in the strong emphasis given to technology in educational action programmes.

The eLearning Programme for 2004-2006 supports actions that foster new approaches to education and training and the development of quality multimedia content and services. Various projects are actually ongoing. They focus on a series of priority areas chosen for their strategic relevance to the modernisation of Europe's education and training systems. These include: promoting digital literacy; encouraging exchange and sharing schemes; strengthening networking between European schools; and sharing and dissemination of best practices.

The opportunities brought by ICT also feature prominently in the EU's policy on life-long learning. In its Communication entitled, *Making a European Area of Lifelong Learning a Reality*, adopted in 2001, the Commission notes the need to develop education and training measures for lifelong learning across Europe. Member States should adapt their formal education and training systems to the demands of the modern environment, breaking down barriers between different forms of learning and giving all EU citizens the chance to develop ICT skills.

These concerns were reiterated in the latest policy review in 2005, which again underlined the key role of ICT in the future of Europe's education and training systems.

The new i2010 initiative, a European Information Society for Growth and Employment, also recognises the importance of learning and skills to Europe's digital economy. It will highlight the opportunities and challenges of eLearning, and its key role in creating knowledge, new innovative learning and content services.

It emphasises the role of lifelong learning, together with innovation and research, in the triangle of knowledge, and underlines the growing needs for digital literacy as an essential competence in the workplace and in the knowledge society. Support for digital literacy and lifelong learning will be a key focus of a proposed European initiative for eInclusion, under i2010, which is planned for 2008.

The European eSkills Forum, a stakeholder group on ICT and e-business skills, has noted the crucial importance of e-skills for the future EU workforce and population and has invited the EU to adopt a comprehensive strategy for improving ICT skills and training. These issues have been taken up by the ICT Task Force, an expert group set up under the i2010 strategy. Based on input from the eSkills Forum, the ICT Task Force and other stakeholders, the Commission is expected to issue an action plan on "eSkills for Competitiveness, Employability and Workforce Development" in early 2007.

Building on the achievements of earlier education and training programmes such as Socrates, the Commission is launching a new Integrated Lifelong Learning programme for the period 2007-2013. The programme covers four areas: schools (Comenius), higher education (Erasmus), vocational training (Leonardo), and adult education (Grundvig). These are complemented by four horizontal areas of activity: policy development, language learning, ICT and dissemination work.

By the end of 2006, a Communication from the Commission will be published on the use of ICT to support innovation and lifelong learning for all. This Communication intends to take the ICT-enabled learning agenda a step forward and to develop a coherent strategy framework for the best possible integration and exploitation of ICT for lifelong learning.

Information Society Activities

Research and Development

European research in this field was part of the Information Society Technologies (IST) programme, one of the thematic priorities in the Sixth Framework Programme (FP6) for Research and Technological Development (2002-2006). Research activities are managed by the **Learning and Cultural Heritage Unit** within DG Information Society and Media.

Technology-enhanced learning (TeLearn for short) research aims at improving our knowledge of how learning can be supported by information and communication technologies. The focus is on intelligent solutions tailored to individual learners, motivating and supporting people who learn on their own or collaboratively with others. Research priorities are to:

- enhance our capacity to **reflect the complexity of learning** in complex and dynamic environments;
- reinforce learning as a **social process** through new collaborative models;
- **customise learning to individual needs** – at school, work, throughout life, ubiquitously;
- **build competence** – by linking organisations' objectives and learning goals of individuals;
- support pedagogical approaches that **blend new and traditional ways of learning**.

Overall, 32 projects were co-funded under FP6, representing total EU funding of €125 million. The projects started between January 2004 and March 2006. They addressed a wide range of research activities to build competences, make learning more efficient and improve take-up and deployment.

Technology-enhanced learning will also be among the research fields addressed through the ICT Priority under the Seventh Framework Programme (2007-2013).

Other Activities

The **eTEN** Programme is concerned with the large-scale roll-out of public interest services, primarily in support of the i2010 initiative. In this context, eTEN projects address eLearning as a main action line. Activities support the efforts of the Member States to accelerate the adaptation of education and training systems for all in the EU and the development of virtual campuses.

The **eContent*plus*** Programme (2005-2008) supports the production, use and distribution of European digital content and promotes linguistic and cultural diversity on global networks. Improving the accessibility and usability of educational material is a key priority.

For the future, and with particular reference to the i2010 strategy, the main such instrument will be the **ICT Policy Support Programme**, which is part of the Competitiveness and Innovation Framework Programme (CIP). With a budget of €728 million, it will stimulate converging markets for electronic networks, media content and digital technologies, test new solutions to speed up the deployment of electronic services, and support modernisation of the European public sector.

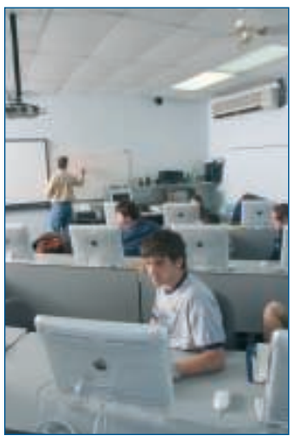
> Excellent Education, Enriched by ICT

Computer-enhanced tools and methods of education have the potential to raise the performance and extend the availability of Europe's educational systems.

Policy Context

Open and flexible forms of technology-enhanced learning contribute increasingly to the quality of education and training systems. ICT make teaching and training processes more tailored to the needs of the learner, help foster and support innovation in pedagogy, and make learning more engaging. They also support organisational transformation within education and training institutions, which will help to improve educational quality, and to extend access to learning beyond traditional educational settings.

Since 2000, the European Union has stepped up its activities to improve learning and to develop skills in the context of the knowledge society. The eLearning Initiative and Action Plan – linked to the eEurope Action Plan – have put eLearning and eSkills high on the political agenda. Nevertheless, integrating ICT as a natural part of teaching and learning at all levels in educational and training systems remains a major challenge for Europe.



The European Commission has been very active in supporting and complementing the efforts of EU Member States to modernise education and training systems. At practitioner level, current efforts in this direction focus on the eLearning Programme (2004-2006). This initiative has four components: to equip schools with multimedia computers, to train European teachers in digital technologies, to develop European educational services and software, and to speed up the networking of schools and teachers. In addition, the European eLearning portal has been set up (http://elearning europa.info) to provide the support structure and act as a hub for promotion and exchange of best practice.

As well as the eLearning Programme, research projects on technology-enhanced learning in the IST programme, projects in the eTEN programme, and projects in the European Social Fund 2000-2006, have demonstrated how eLearning helps create new forms of learning within the education and training systems, at work and in society at large.

The European eSkills Forum, a stakeholder group on ICT and e-business skills, recognised the crucial importance of eLearning for designing innovative e-skills training solutions. The launch of the i2010 Strategy, Lifelong Learning programme (2007-2013) and continuing research under the Seventh Framework Programme will provide renewed impetus to Europe's efforts to use ICT to enhance learning, help workers acquire key skills and competences, and support our society to become more inclusive.

Future of eLearning

eLearning is progressing from the basic use of ICT for learning (e.g. as a research tool and replacement for books), to new forms of education and training – which emphasise creativity and collaboration – and new skill requirements for the knowledge society. This, in turn, requires a significant change of emphasis, away from a focus on technology, connectivity and the internet, towards a greater consideration of the context of learning, and of the need for collaboration, communication and innovation.

Despite the considerable efforts undertaken, the eLearning sector is still fragmented and there are many open questions on how to exploit the potential of ICT in education and training. A broad partnership between the various stakeholders of industry, education and training, public sector and civil society is needed for Europe to reap the full benefits of ICT and learning in the knowledge society.

Creating Affordable eLearning Content

One of the main obstacles to the greater take-up of eLearning is that high-quality content can be expensive and difficult to access and re-use. **CELEBRATE**, an IST-FP5 project, created an internet portal of "learning objects", that is, small, digitallesson units that can be reused and combined to build tailor-made courses for lessons. Over its lifetime, the project built a critical mass of over 350 learning objects, mainly in the fields of maths, science, languages and art.

Some 320 schools signed up to test the content, which has now been opened to schools all over Europe through European Schoolnet, a co-operative network between the European ministries for education. Initial testing was very encouraging: in an online focus group of 40 teachers, the learning objects achieved a satisfaction rating of 66%. The project culminated in policy recommendations on the future development of learning objects.

Validation of Results

Validation, by exposure to real learning environments, of the educational content and of the teaching models and methods is essential to reap the full benefits of ICT in learning. **EUN VAL NET**, an IST-FP5 project, was probably the largest validation project ever undertaken in European schools. It improved our understanding of the effects and issues related to the introduction of innovative technological tools in schools, in particular the effect of schools' internal cultures. It led to a deeper understanding of how innovative ICT tools are assimilated by teachers and students and how this innovation process can result in more effective teaching and learning practices.

Building on these methods, the FP6 project **CALIBRATE** brings together eight Ministries of Education (six from new Member States) to carry out a multi-level project designed to support the collaborative use and exchange of learning resources in schools. It will develop and help ensure the take-up of an open source technical architecture and an open source learning toolbox that support the collaborative use of learning resources. CALIBRATE will validate results in up to 100 schools using an advanced methodology.

By linking with a number of other European Schoolnet projects and initiatives, it will build a wider framework and foundations for policies and for the implementation of a new European Learning Resource Exchange.

Virtual Campuses and Sharing for Higher Education

With the world of higher education increasingly competitive, many institutions are looking to virtual working to achieve critical mass as centres of high-quality learning. IST-FP6 project **iCamp** has the vision to become the educational web for higher education in the enlarged Europe. It will provide an infrastructure, the 'iCamp Space', for collaboration, content sharing and social networking across systems, countries and disciplines. Interoperability amongst different open source learning systems and tools is the key to sustainability of iCamp.

> PROJECT DETAILS

CALIBRATE - Calibrating eLearning in Schools
http://calibrate.eun.org

CELEBRATE - Context eLearning with Broadband Technologies
clara.navas@eun.org • http://celebrate.eun.org

EUN VAL NET - European Schoolnet Validation Networks of Excellence
http://valnet.eun.org

I-CAMP - Innovative, Inclusive, Interactive & Intercultural Learning Campus
icamp-contact@zsi.at • http://sileegitim.isikun.edu.tr/

> Inspiring Interest in Learning Science

Maths, science and technology (MST) are key to Europe's competitiveness and a basic competence for all citizens. ICT can help re-engage young people with these essential skills.

Policy Context

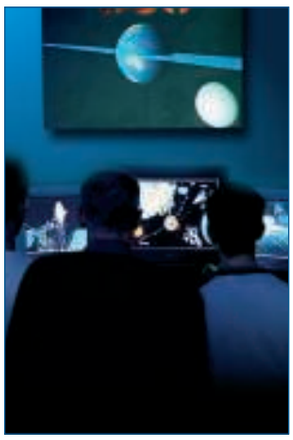
Scientific and technical skills are crucial to Europe's future. For Europe to be able to compete on global markets and to meet the Lisbon targets for growth and jobs, it needs a pool of highly skilled scientists, engineers and mathematicians. Moreover, as the everyday world becomes ever more complex, it is essential for all citizens to have a good understanding of mathematical concepts, and a reasonable level of literacy on science and technology. Indeed, in a Recommendation published in 2005 as part of the Commission's lifelong learning policy, MST was identified as one of eight key competences necessary for every European to prosper in a knowledge-based society and economy.

The EU benchmark for the total number of graduates in MST has been set to increase by at least 15% by 2010 with, at the same time, a decrease in the gender imbalance. Reaching the benchmark implies an increase of about 100,000 graduates, to 748,000 in 2010. Despite the progress observed, the percentage of new graduates in these areas is not enough to fulfil the increasing demand from academia, industry and service sectors. In some Member States interest in MST in schools and universities is, in fact, falling, contributing to a widening gap between supply and demand.

Thus, Europe must encourage children and young people to take a greater interest in MST and to ensure that those already in scientific and research professions find their careers, prospects and rewards sufficiently attractive to keep them there.

The informal Meeting of Ministers of Education and Ministers of Research in Uppsala (March 2001) underlined the importance of increasing recruitment to scientific and technological disciplines, including a general renewal of teaching approaches and fostering closer links to working life and industry throughout the whole education and training system.

MST education should be an entitlement for every child and introduced at an early age. More effective and attractive teaching methods should be introduced, in particular by linking learning to real life experiences, working life and society, and by combining classroom-based teaching with appropriate extracurricular activities such as science fairs, competitions, science camps, visits and museums. A broad approach is necessary, since no single measure alone will be sufficient to achieve the overall goal, and different students will be influenced by different kinds of measures.



Contribution of ICT

Quality educational content delivered by ICT is one way of making science-based education more engaging. Recent research shows how technologies can help motivate and engage pupils, so promoting better take-up of scientific disciplines at school and university. IST research projects have focused on technology-enhanced learning methods in subjects as varied as astronomy, archaeology, space research, physics, mathematics and the earth sciences.

The **ModellingSpace** project, for instance, brought together five universities across Europe to develop an open learning environment for modelling exercises for 11 to 17 year old students. The environment allows students to create multimedia presentations of scientific ideas. Results from the project were integrated into the training of new teachers in the French-speaking community in Belgium.

CO-LAB also explores the concepts of modelling and simulation but goes a step further in terms of sophistication and realism. Students are able to control an actual scientific experiment and then work together to develop a mathematical model which they compare against the experimental results.

Lab of Tomorrow focused on science experiments. It developed a number of tiny, programmable devices that can be embedded in clothing to monitor the wearer's heart rate, running speed and a host of similar data. Measurements may be collected on the sports field and later analysed. The schools involved in these experiments reported a noticeable increase in students registering in science and technology courses.

The most recent project in the MST area is **ReMath**, which addresses the problem of wide-ranging dissatisfaction with the state of mathematics education in Europe and the weak impact of using ICT for its improvement. ReMath's reseachers will develop six state-of-the-art dynamic digital artefacts dealing with different aspects of mathematics, involving the domains of algebra, geometry and applied mathematics. They will then develop educational scenarios for the use of these artefacts, and carry out empirical research involving cross-experimentation in realistic educational contexts.

Other aspects of science learning being addressed in IST research include: **COLDEX**, using ICT to support collaboration in scientific experiments and modelling; **ASH**, stimulating school pupils into studying astronomy and space physics; **LeActiveMath,** web-based active learning in maths; and **LAB@Future,** a virtual reality laboratory for conducting scientific experiments.

Connecting Formal and Informal Science Learning

Informal learning environments, such as science museums, discovery centres and exploratoriums, are as important to children's education as attending a traditional school. IST-FP6 project **CONNECT** aims to give such informal settings a bigger role in science education. It is creating a network of museums, science centres and schools across Europe to develop and evaluate new types of learning schemes that build on the strengths of both formal and informal strategies.

The learning environments developed will allow students to interact physically and intellectually with instructional materials through 'hands-on' experimentation and 'minds on' reflection. Such an approach will enable students to 'learn to learn' and will encourage experimental, theoretical and multi-disciplinary skills. Virtual learning communities of students and educators will be created that are able to communicate and collaborate openly.

> PROJECT DETAILS

ASH - Access to Scientific Space Heritage
www.virtualcontrolroom.org

CO-LAB - Collaborative Laboratories for Europe
info@co-lab.nl • www.co-lab.nl

COLDEX - Collaborative Learning and Distributed Experimentation
info@co-lab.nl • www.coldex.info

CONNECT - Designing the Classroom of Tomorrow by Using Advanced Technologies to Connect Formal and Informal Environments
www.connect-project.net

Lab of Tomorrow
sotiriou@ea.gr • n/a

Lab@Future - School Laboratory Anticipating Future Needs of European Youth
contact@labfuture.net • www.labfuture.net

LeActiveMath - Language-Enhanced, User Adaptive, Interactive eLearning for Mathematics
www.leactivemath.org

ModellingSpace - A Space for Ideas' Expression, Modelling and Collaboration for the Development of Imagination, Reasoning And Learning
n/a

ReMath - Representing Mathematics with Digital Media
http://remath.cti.gr/

> Refreshing our Skills and Learning for Life

Modernising education and training systems is a vital ingredient for prosperity and social cohesion in Europe. Lifelong learning strategies are centre stage in these efforts.

Policy Context

Lifelong learning occupies an increasingly central position in the EU's education and training policies. The knowledge-based economy, along with wider economic and societal trends such as globalisation, changes in family structures, demographic change and the impact of ICT, present the European Union and its citizens with many potential benefits as well as challenges. To take full advantage of these opportunities we need to be open to acquiring knowledge and developing new skills and competences throughout our lives.

Although lifelong learning is gaining ground in Europe, too few adults are benefiting from it. According to the latest estimates, only around 10% of adults in the EU aged 25-64 take part in lifelong learning. Almost 16% of young people in the EU still leave school early, and nearly 20% of 15 year olds continue to have serious difficulty with reading literacy. Only around 77% of 18-24 year olds complete at least upper secondary education, still far from the EU benchmark of 85%. In a world that is increasingly reliant on knowledge and skills, such a situation is storing up problems for the future.

A Council Resolution on lifelong learning in 2002 stressed the need for all Member States to develop coherent and comprehensive strategies. Relevant actions are reflected in the work programme for Education and Training 2010, which also includes specific actions for vocational education and training (the 'Copenhagen process') and higher education ('the Bologna process'). This work programme is the education and training strand of the Lisbon strategy and aims to modernise Europe's education and training systems.

In the latest policy review, published as a Communication in November 2005, the Commission calls for Member States to speed up the pace of reforms in education and training systems to avoid large proportions of the next generation facing social exclusion. To help achieve this, the Commission has set out what it sees as eight key competences every European citizen should have to prosper in a knowledge-based society and economy. These include the ability to communicate in foreign languages, basic competences in maths, science and technology, digital competence, and interpersonal and intercultural skills.

Contribution of ICT

The goal of lifelong learning implies a culture where people regard knowledge and skills acquisition as a continuous part of everyday life. Learning cannot, therefore, be confined to traditional settings, such as school or university, and then left behind as a finished and acquired asset. It must be maintained, refreshed and extended. Learning needs to coexist harmoniously alongside normal life, and must be accessible whatever a person's inherent intellectual capability, family situation, health, culture, gender, language or geographical context. Education has to meet people where they are. It must break down the barriers of distance.

ICT has an indispensable role to play. It can bring educational materials to people. It can bring people together in real and virtual communities. It can help them find what is available, matching aspirations with resources. And ICT can provide measurement and assessment services, defeating some of the cross-cultural and interpersonal biases that creep into traditional systems of reward and assessment.

A European Marketplace for Lifelong Learning

The internet provides a convenient tool for accessing educational and training resources from a distance. But how do people find out what is available, and where should they go to fulfil their lifelong learning needs? **MetaCampus**, an FP5 project, developed an online marketplace that matches lifelong learners with resources, training and job-specific information.

Using the MetaCampus online portal, users are able to select, purchase and access resources best fitting their individual learning needs and goals. The software platform is made up of various modules. The User Catalogue tracks personal interests, history and profile, while a Learning Resources Catalogue stores learning resources. A 'virtual tutor', based on intelligent agent technology, makes a match between the two. Detecting gaps in users' existing competences versus their career targets, it is able to recommend resources and training programmes. An e-payment module computes end-users' costs and providers' revenues.

The portal focused initially on training within the IT sector and was further validated under the eTEN project MetaCampus REAL.

Taking the Next Steps

Taking stock of the next steps and finding the right policies and initiatives for the future is an essential, ongoing function. **KALEIDOSCOPE**, an FP6 network of excellence, brings together researchers involved in many areas of cutting-edge research in technology-enhanced learning. The network has a strong practical orientation, aimed at increasing innovation and competitiveness, and generating new forms of cultural and learning experiences.

For Europeans to realise their full potential in this environment, we need to know much more about the complex interplay between technology and learning. KALEIDOSCOPE places the learner at the centre of a multidisciplinary research perspective, with theoretical foundations in the cognitive and learning sciences as well as in computer science and technology design. A shared virtual laboratory provides tools and technologies for KALEIDOSCOPE researchers.

By helping members to share, exchange and reuse software, standards and techniques, the laboratory promotes technical interoperability between learning environments and tools.

One of its key aims is to link research with commercial service providers in the technology-enhanced learning market. A forum known as the Academy-Industry Digital Alliance (AIDA) is building pathways between the different stakeholders in this emerging marketplace, so as to explore options for the exploitation of research.

> PROJECT DETAILS

KALEIDOSCOPE - Concepts and Methods for Exploring the Future of Learning With Digital Technologies
kaleidoscope@fist.fr • www.noe-kaleidoscope.org

METACAMPUS - MetaCampus for Life-Long Learning
pedward@uoc.edu • www.learningcitizen.net/metacampus/