



Leonardo da Vinci

LEONARDO DA VINCI ist das Aktionsprogramm der Europäischen Union für die berufliche Bildung. Der Europäische Rat hat die zweite Phase des Programms am 26. April 1999 verabschiedet. LEONARDO II hat eine Laufzeit von sieben Jahren (2000 – 2006) und ist mit einem Gesamtbudget von 1,15 Mrd. € ausgestattet.

LEONARDO DA VINCI unterstützt und ergänzt die Berufsbildungspolitik der Mitgliedstaaten. Durch transnationale Zusammenarbeit sollen die Qualität erhöht sowie Innovationen und die europäische Dimension in den Berufsbildungssystemen und -praktiken gefördert und damit ein Beitrag zur Leistungsfähigkeit in den Mitgliedstaaten erbracht werden.

Das Bundesministerium für Bildung und Forschung (BMBF) als politisch verantwortliches Ressort hat die Nationale Agentur Bildung für Europa beim Bundesinstitut für Berufsbildung (BIBB) mit der Durchführung des Programms LEONARDO DA VINCI in Deutschland beauftragt.

Die von der Nationalen Agentur beim BIBB herausgegebene Editionsreihe „impuls“ dient dazu, Ergebnisse von LEONARDO-DA-VINCI-Projekten zu präsentieren, Innovationen und Entwicklungen in der Berufsbildung aufzuzeigen und zu verbreiten sowie einen umfassenden Meinungs- und Erfahrungsaustausch zu initiieren.

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Verantwortlich (i.S.d.P.):  
Klaus Fahle

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Dr. Peter Littig  
Erik Heß

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## E-Learning in Europe – Results and Recommendations

Thematic Monitoring under the LEONARDO DA VINCI-Programme

Graham Attwell  
Lone Dirckinck-Holmfeld  
Peter Fabian  
Andrea Kárpáti  
Peter Littig



## PREFACE

### Networking – sharing experience – co-operation: Thematic Monitoring under the Leonardo da Vinci programme

Leonardo da Vinci, the action programme for the implementation of a European Vocational Training policy supports some 200 projects per year, contributing to the promotion of a Europe of knowledge by promoting co-operation in the field of education and vocational training.

In order to increase and to strengthen networking, sharing of experiences and co-operation between individual Leonardo projects, the European Commission launched in 2002 the 'Thematic Monitoring' initiative. This initiative should help to raise the quality and visibility of the projects and respective achievements and it should facilitate the dissemination and exploitation of project results.

In close co-operation with the Leonardo National Agencies five main themes have been identified to get the initiative off the ground:

- integration into the labour market;
- development of skills within enterprises, in particular within SME's;
- adaptation of the training supply and new training methods – quality of training;
- transparency, assessment and validation of knowledge;
- eLearning.

The eLearning Group is managed by the German National Agency with the support of the Agencies from Denmark, Finland, Greece, Hungary, Ireland, Lithuania, Portugal, Slovakia, Slovenia, The Netherlands, United Kingdom, and representatives of the Commission as well as the Technical Assistance Office. The group set up a work plan for 2003 which included the documentation of some 150 relevant projects, the organisation of a European seminar and of two European conferences, and last but not least, the execution of a study to promote a better understanding of the content, characteristics, strengths and weaknesses of eLearning projects under the Leonardo da Vinci programme.

We are very pleased to present in the following pages the concrete outcome of the study. Although limited in time and in budget, it delivers interesting conclusions

and recommendations, which we expect will stimulate discussion and action beyond the Leonardo community.

eLearning is considered as instrumental in implementing the paradigm of lifelong learning and in contributing to the ambitious goal fixed at the Barcelona Summit in March 2002, namely to make the European Education and Training systems a world-wide quality reference by 2010.

The study highlights that eLearning-related approaches have so far been too technology- and/or media-oriented; the recommendations point out that a strong focus on learning, on the learner and on teachers/trainers is necessary.

The study is a very first step under the thematic monitoring initiative; further active participation and involvement are required. In particular, substantial action is necessary to increase awareness about the most successful Leonardo projects with the stakeholders, training providers and companies to increase the exploitation, take-up, impact and sustainability of projects' outcomes and findings. We also hope that the study will stimulate debate around the actions that decision makers might have to take for a systematic implementation of eLearning.

We wish to thank the authors of the study and the National Agencies involved for their contributions to the study and to the ongoing thematic monitoring activities, and particularly Erik Hess from the German NA as well as Peter Baur from the European Commission for coordinating these activities.



Sergio Corti  
European Commission  
Brussels - Bonn, October 2003



Klaus Fahle  
National Agency at the BIBB



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## FOREWORD

We are very happy to present the results of the Thematic Monitoring of eLearning projects within the Leonardo da Vinci programme.

If we are honest the monitoring was not easy work, but it was very interesting and all of us learned a lot.

The most difficult part was the initial stage due to the lack of basic information – the first step of the monitoring was dependent on the quality and availability of information from the National Agencies and the European Commission.

Another problem was the time available to undertake the work. For several different reasons the project time was limited to five months in total. Within this time we had to analyse nearly 150 projects and to document the results and provide recommendations.

The time frame and the limited nature of basic information available about the Leonardo projects in different countries are clearly limiting factors in this report. Nevertheless we believe this report does provide

valuable data and raises important issues in developing the use of Information and Communication Technologies for education and training. We are convinced a follow up exercise with a longer time framework, or ongoing monitoring accompanying project development, would yield further results.

During the second phase of the monitoring we had the opportunity to examine selected projects in more depth. In this we were greatly helped by the project promoters and coordinators and would wish to thank them for this support.

We also like to thank the National Agencies and the steering committee for their support and engagement.

On behalf of the Thematic Monitoring group



Dr. Peter Littig  
Stuttgart, 3<sup>rd</sup> November 2003

## 1. Introduction

At the end of 2002, the European Commission Directorate General for Education and Culture commissioned a thematic monitoring study of eLearning for vocational training within the Leonardo da Vinci Programme. The project was to take six months.

The goal of the study is to analyse relevant projects which are being conducted through the Leonardo da Vinci programme, and to indicate how and to what extent these projects address issues and challenges in the thematic area of eLearning. The analysis of these projects is to help to define which themes are not sufficiently covered by current projects and to provide recommendations for follow-up activities as part of the thematic monitoring. In addition, particular attention will be addressed to the current situation of vocational training in regard to eLearning. In this way, a solid foundation for future work in this important area can be established.

## 2. General Approach

The critical role of new learning technologies in vocational training is undisputed. The rapid pace of change, the shift in training philosophy from "just-in-case" to "just-in-time" and the changing nature of the workforce itself underpin this development. Information and Communication Technologies (ICT) drive innovation and bring about changes in the modern workplace and in production and business processes. As a result, new job descriptions and qualification profiles arise which the vocational training system must accommodate. Simultaneously, eLearning, understood as online learning or web-based learning, raises expectations as to what sophisticated multimedia technologies may contribute to meeting customers' training needs. It is important in this context to recognize the importance of suitable didactic and methodological models for this training and that success also depends on the pedagogical and computer skills of the trainer.

The Decision by the Council, dated 26 April 1999<sup>1</sup>, which established the second phase of the Programme, mandates regular monitoring and evaluation of projects, in particular those awarded according to:

- procedure B (pilot projects at national level) and
- procedure C (centralised projects at Community level).

Furthermore, the Programme Committee supported the principle of a joint thematic back-up of these projects so as to provide greater visibility to the work carried out and to create synergies between the different actors. This back-up would establish interfaces between the two levels of implementation of the Programme.

A project team under the leadership of Dr. Peter Littig, DEKRA Akademie GmbH, with the assistance of Professor Lone Dirckinck-Holmfeld, is responsible for this study. They are working closely with the Commission and National Agencies (NAs).

### 2.1 Content of the Study

This report addresses a number of topics:

- It summarises the most important research questions and innovations in the area of eLearning, taking into consideration the most recent policies of the Community. This also includes a review of relevant existing studies and publications in this thematic area, in particular in reference to the Communication from the Commission "Making a European Area of Lifelong Learning a Reality" [COM(2001) 678 final] and the Communication from the Commission to the Council and the European Parliament "The eLearning Action Plan – Designing Tomorrow's Education" [COM(2001)172 final].
- It analyses the potential contribution of relevant Leonardo Da Vinci projects to the development of innovative approaches in the thematic area of eLearning with special consideration of their structure and internal project communication and defines the conditions for successfully spreading these practices to other Member States.

<sup>1</sup> Decision of the Council 1999, Official Journal No. L 146/33 dated 11. 06. 99 (1999/382/EG)

- The study goes on to identify the means and methods in which innovation is handled in the projects. Among other things it identifies problems faced by projects, the criteria for determining innovative approaches, methods for implementing innovative ideas, as well as innovative products and processes.
- Additionally, it draws conclusions that will identify both developments and gaps that might be developed further within the framework of new calls for proposals.
- Last but not least, it includes recommendations for proceeding with the thematic monitoring process.

## 2.2 Focal Point of Discussion

Which aspects form the focal point of the discussion of the projects, which have been monitored?

1. We considered it particularly important to research whether the projects approach eLearning more as a consumer product or consider it a framework for distance and integrative learning amongst peers (eCollaboration).
2. Along these lines, we considered whether it is the learner or the technology that is the centrepiece of the project.

Our monitoring framework has been one which stimulated discussion of the particular factors affecting the learning environment, such as the learning setting, the social situation and also the particular requirements placed upon the learning facilitator within the context of the project. That is why we are making concrete statements within this study regarding the possible social and political influence that the results of individual projects may generate, as well as which influences of this type may be desirable.

## 2.3 Methodology

The information gathering and research was undertaken by a project team of five subject experts:

- Prof. Lone Dirckinck-Holmfeld, Ph.D. – Research professor in ICT and Learning at Aalborg University, Department of Communication, Denmark;
- Andrea Kárpáti, Ph.D. – Educational researcher and UNESCO Chair for ICT in Education at Eötvös Loránd

University, Faculty of Sciences, Budapest, Hungary;

- Graham Attwell, BA (Hons). – Director of KnowNet and European Centre for Collaborative Research and Learning, Bangor, Wales, UK;
- Prof. Peter Fabián, Ph.D. – Associate professor at the Faculty of Management Science and Informatics at the University of Žilina, Slovakia
- Dr. Peter Littig, Dipl.–Math. – Director Educational Policy and Strategy at the DEKRA Academy in Stuttgart, Germany.

The team reviewed around 150 projects (see annex) in the first stage of the project.

The team was led by Peter Littig from the DEKRA Akademie GmbH in Stuttgart, Germany. Mr. Littig oversaw the project as a whole, coordinating the activities of the team members and ensuring the timely accomplishment of milestones set for the project. He is the primary point of contact for the European Commission, the steering committee and the Leonardo National Agencies (NAs). In these activities, Prof. Lone Dirckinck-Holmfeld assisted him and acted as co-chair. The establishment of a two-person leadership for the project ensured that the project moved forward in an efficient manner.

The experts defined guiding questions to help review all projects which were part of theme 5 (eLearning) of the thematic monitoring. The guiding questions were based on current research and discourse on eLearning and vocational education and training. Each expert selected five projects for detailed examination and follow up in the second phase of the monitoring process.

The overview of the eLearning projects and the selection for the second stage was discussed during a project team meeting in Berlin in March 2003.

The meeting discussed the main issues to be pursued in stage two of the project and designed a semi-structured questionnaire for the projects selected for follow up as a means to identify both innovation and good practices.

The questionnaire was implemented through visits to selected project co-ordinators or, more often, through telephone interviews. The telephone interviews took about two hours and have been documented in short

reports (about four pages per project) focused on the main issues of the study. These form part of the final project report.

The results identified best practices and, together with the outcomes of the first and second stages in the monitoring process, contributed to the formulation of concrete recommendations for future action.

In conducting this project, the expert group worked closely with the Commission and NAs, both of whom were primary sources of information. The Commission provided the expert team with information on the procedure C projects whilst the NAs provided the expert team with information on the procedure B projects.

Additionally, the project work was monitored by a steering committee established by the NAs. Finally, the working process of the experts and the interim results of this monitoring have been discussed with the Steering Committee, with the National Agencies and with representatives from the European Commission.

At the end of the monitoring phase, a draft report has been prepared and circulated for comments and additional input. On the basis of this feedback, the final draft and conclusions have been developed.

## 2.4 Key issues in the eLearning Discussion in Europe

The EU eLearning Action Plan<sup>2</sup> defined eLearning as “the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration.” The EU Lisbon, Stockholm and Barcelona Councils called for sustained action to integrate ICT in education and training systems.

These initiatives reflect the intensive and fast growing development in the use of ICT for learning, especially during the last twenty years. Since the first personal computers arrived on the market in the early 1980s, the use of ICT has become an increasingly normal part of everyday life for growing numbers of people. As personal computers became more common, there were early attempts to develop ICT supported learning processes. This development far pre-dated the Internet

as a medium for learning. It was assumed that Computer Based Training (CBT) programmes would make learning easier and less expensive. This dream has expanded over the last ten years leading to international and especially European programmes and initiatives to integrate the use of ICT in education and training.

Since 1995, the European Commission Leonardo da Vinci programme has promoted an eLearning strand leading to many innovative and interesting outcomes with an impact in pedagogical, social and institutional terms.

During the first years of using the internet and ICT, most of the eLearning projects, even those aiming to design learning processes, were focused on technical innovation to create technology based learning environments.

There would appear to have been a change in thinking on eLearning in the past three to four years, with a new focus in the discussions on eLearning. Rather than the emphasis on technology, the new focus of thinking on eLearning is increasingly on the learner him/herself and on methodologies and didactics. This seen as more important in developing the quality of eLearning provision and ensuring the success of ICT supported learning processes.

In spite of all the new possibilities of ICT to help and motivate the learner and to involve learners in the learning –process, learning is still hard work (Nevgi, 2002). In her keynote speech, “Dropping the e and keeping on learning”<sup>3</sup>, presented at the Leonardo da Vinci Conference in Dipoli, Anne Nevgi made clear that in spite of the rapid advance of technology we have to solve very traditional problems if we want to make learning processes more successful. This includes helping people to change the way they see, experience, understand and conceptualise the real world<sup>4</sup>.

eLearning moves the learning experience from the traditional classroom into the learner’s world, providing access to learning anytime and anywhere without geographical or time barriers, and the internet provides access to learning materials and interaction with experts and fellow learners<sup>5</sup>. This leads to the recognition that eLearning is a useful tool to help develop learning processes, but that the pedagogical design of the whole learning process (possibly supported by

<sup>2</sup> COM (2001) 172 final

<sup>3</sup> Dropping the e and keeping on learning , keynote by Prof. Anne Nevgi, Senior Researcher, Department of Education, University of Helsinki

<sup>4</sup> Cf. Ramsden, P., *Improving Learning: New Perspectives*, London 1988

<sup>5</sup> Cf. [www.ucalgary.ca/cted/elearn](http://www.ucalgary.ca/cted/elearn)

eLearning) will be decisive for the learners' success. This thinking on eLearning is also reflected in the concept of eLearning in the European context promoted in the European Commission's Barcelona declaration in March 2002: "In order to raise the niveau of learning in Europe, the integration of ICT in the educational process is seen as an opportunity to advance the change process and to increase both quality of and accessibility to learning processes."

The basic thinking behind the thematic monitoring of the present state of play in eLearning and vocational training was influenced by the results of a DEKRA study on the eLearning in Germany<sup>6</sup> which was published in 2002.

The main focus of the DEKRA study on eLearning trends was the implementation of eLearning in companies throughout Germany and the formulation of initial conclusions on future developments in eLearning. One of the most significant results of this study was that despite much scepticism it is not so much a question of whether eLearning should be deployed, but rather how, when, and to what end.

This study found that, according to human resources professionals and potential learners, the success of eLearning depends to a great extent on the attitude of the learner towards the learning situation. All other considerations are secondary: learning processes in which the learner does not constitute the primary focus are doomed to failure from the beginning. The value of media supported learning scenarios, even those that are highly technical in structure, does not depend so much on the technical expertise with which such scenarios are implemented, but rather is dependent upon the relationships between the learner and learning facilitator. These are necessary to realize the full potential of learning as an individual process and as a social process.

The introduction of eLearning does not end with the establishment of a suitable learning platform, but rather it is here that the real challenge begins.

Thinking on eLearning in the past has concentrated on technological issues, taking into account questions like:

- How can we provide reasonably priced training "just in time", anytime and anywhere?
- How can we determine the degree of learning success in the least complicated manner?
- How can learning processes be easily administered?

However, it is impossible to ignore any longer the need to focus on the quality of the learning process itself. This "new" thinking on eLearning implies questions such as<sup>7</sup>

- Are goals being pursued that are in the interest of the learner?
- Is the content really important for the learner?
- Are the teaching methods suited to initiating and supporting the learning process?
- Does the learning programme lead to the desired results?
- Does the eLearning approach ensure a higher motivation to learn than traditional learning approaches?
- Which understanding of eLearning forms the basis of the eLearning approach?

The new thinking on eLearning implies, in this sense, a demand for a solid, objective-driven and methodologically sound foundation as well as a learner centred approach. These ideas have led to more critical thinking on learning itself as a process which helps to define and to determine the success of eLearning processes.

If we want to define the success of any learning process we have to decide first which category of learning will be addressed in a learning programme. Categories of learning can be characterized by the description of the central aims of the learning process<sup>8</sup>. These categories describe:

- Learning as a process for acquiring information;
- Learning as a process for acquiring information and processing experience;
- Learning as a process for acquiring information and processing experience that effects a long-term change in the consciousness of the learner;
- Learning as a process for acquiring information and processing experience in which the learner

<sup>6</sup> Littig, P., Klug durch eLearning?, Bielefeld 2002

<sup>7</sup> Cf. Dichanz/Ernst: eLearning – begriffliche, psychologische und didaktische Überlegungen [eLearning – conceptual, psychological and didactic considerations]

<sup>8</sup> Cf. Dichanz/Ernst: eLearning – begriffliche, psychologische und didaktische Überlegungen [eLearning – conceptual, psychological and didactic considerations]

integrates new information and experience into his/her current knowledge base;

- Learning as a process for acquiring information and processing experience in which the learner perceives, selects and integrates new information and experience into his/her current knowledge base, thereby changing it;
- Learning as a process for acquiring information and processing experience, in which the learner selects and constructs knowledge that is useful and appropriate for him/herself and in turn uses this to drive and determine his/her own continuous learning process;
- Learning that becomes an individual process of interaction between the individual and his/her environment, in which the subjective reality of the learner is actively constructed.

The more technologically driven eLearning products of the past period have tended to concentrate on a view of learning in the sense of the first category: learning as a process for acquiring information.

As a consequence of the technology focus, eLearning developers have often ignored fundamental pedagogical and andragogical maxims<sup>9</sup> such as:

- Learning is most fundamentally a social process;
- Learning is an individual process through and through;
- Learning is basically a self-guided process;
- Adult learners are characterised by rich learning biographies;
- Adult learners have clear goals in mind.

### 3. Emerging Issues

#### 3.1 Basic questions for the Study

The new thinking on eLearning, starting from the necessity of learner orientation and ending with the reversal of the development schema, led to our basic questions for the monitoring study in first phase of the thematic monitoring:

To remember and to recognise these pedagogical and andragogical maxims helps to a realisation of what can be realistically accomplished by eLearning processes, given that there is no sure method that will make someone learn! What eLearning (and traditional learning) methods can accomplish, however, is:

- to make learners curious,
- to motivate learners,
- to provide a challenging learning environment,
- to provide individual and collaborative support for learning.

This is why the new thinking on eLearning has to be followed by a reversal of the technology driven development schema:

Learning media > Learning environment >  
Categories of learning > Learning objectives >  
Learner

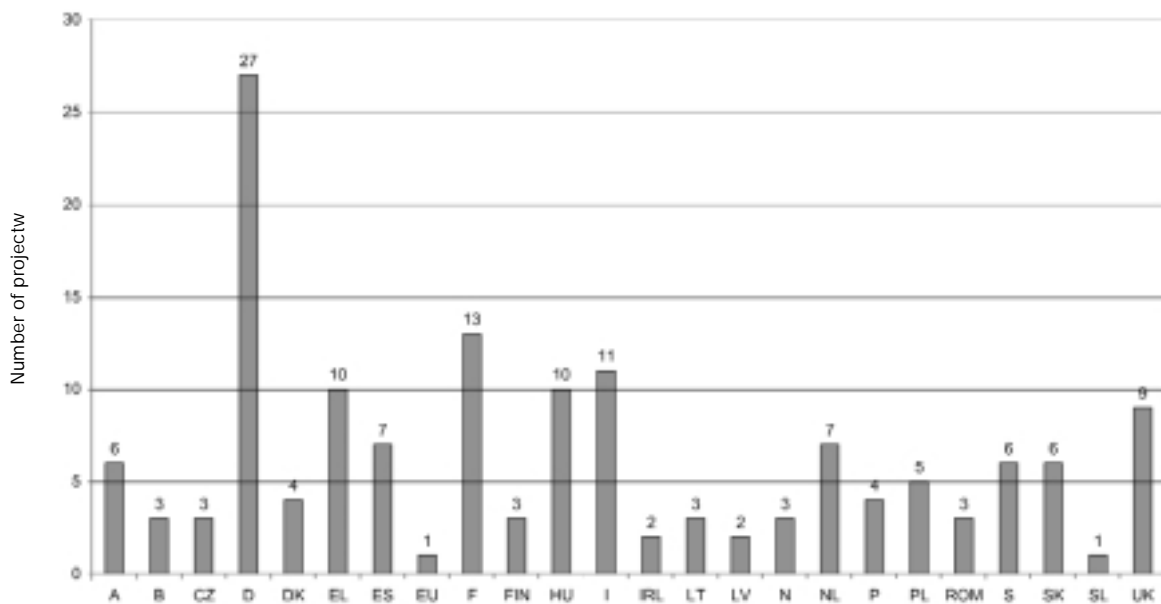
to a pedagogical/andragogical driven development schema:

Learner > Learning objectives > Categories of learning > Learning environment > Learning media

- To what extent is there a learner orientation as opposed to a technology orientation in the individual projects?
- What role does the environment play in the individual projects (learning environment, social constellation, etc.)? Which steps in the development schema are the focal points of the projects? Upon which learning approach are the projects based?

<sup>9</sup> Cf. Dichanz/Ernst: eLearning – begriffliche, psychologische und didaktische Überlegungen [eLearning – conceptual, psychological and didactic considerations]

## Leonardo da Vinci – Procedures B & C: Nationalities



- Which innovative contributions can the Leonardo programmes make and under which conditions can such innovations be propagated Europe-wide?
- Which concrete innovative tools, techniques and methods can be identified in the projects?
- Which questions should future projects more specifically try to answer?

### 3.2 Results of the first Phase

#### Where do the projects come from?

In total, the first phase of the thematic monitoring examined 149 projects from throughout Europe.

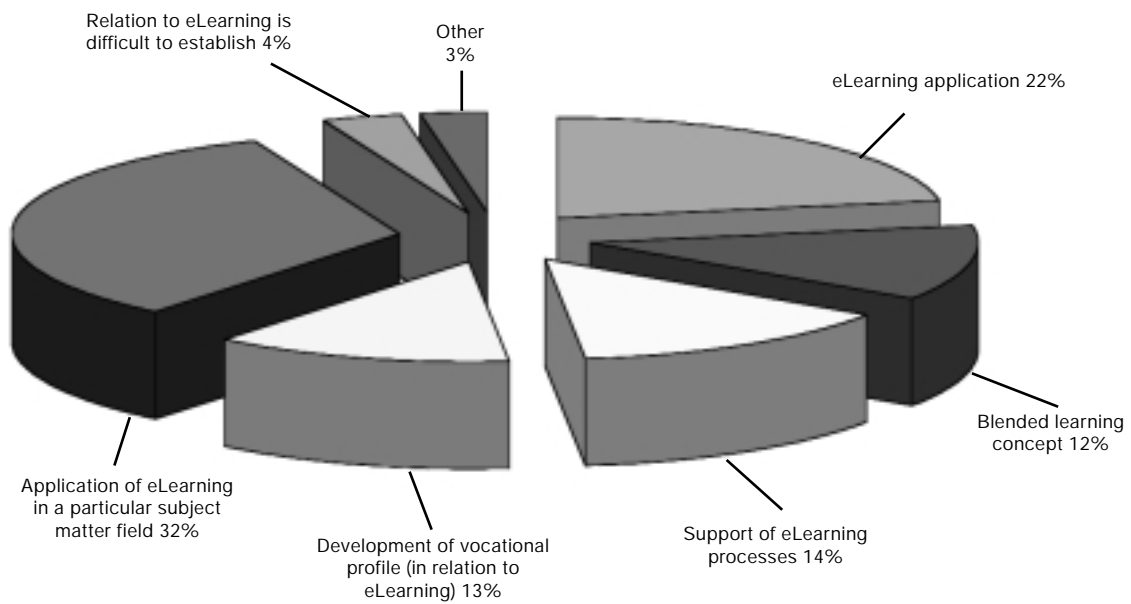
The preceding graph shows the countries of the project promoters. The project promoters from the 149 eLearning projects are drawn from 24 European countries, each one with at least 3 partner countries and sometimes as many as twenty-five and more!

How can these eLearning projects be characterized? In order to gain an overview of ideas and aims of the Leonardo projects the project team formulated more detailed “guiding questions”:

How can the project be classified in general, concerning its relation to eLearning?

- ELearning application
- Blended learning concept
- Support of eLearning processes
- Development of vocational profile (in relation to eLearning)
- Application of eLearning in a particular subject matter field (please specify)
- Relation to eLearning is difficult to establish?
- Other (please specify)
- Is the understanding of eLearning in the special project more one that regards eLearning as an isolated consumer product rather than an integrated part of a complex learning process or vice versa?
- Which kinds of processes are supported mostly in the eLearning project? (Individual processes, social processes or others?)
- Can the idea of eLearning within the specific project be characterized as “technology driven” or more as “driven by learner orientation”?
- Does the idea of eLearning mostly support a development schema which is characterized by the chain: Learning media, learning environment, categories of learning, learning objectives, learner?
- Does it support instead a development schema which is represented by the chain Learner, learning objectives, categories of learning, learning environment, learning media?

## How can the project be classified in general, concerning its relation to eLearning?



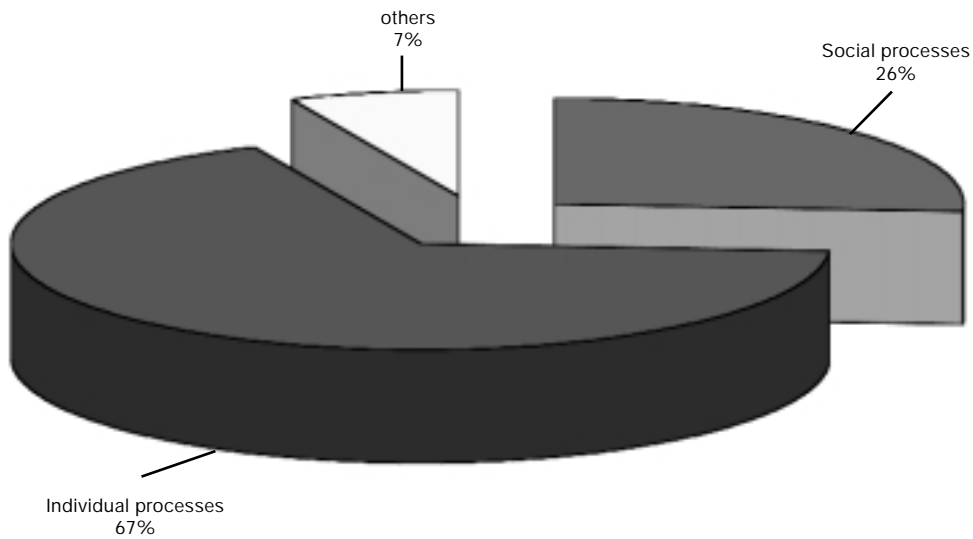
- Which element(s) of the chain receive(s) the most attention within the specific project?
- Is eLearning in the specific project oriented towards workspace learning or institutional learning or both?
- Does the specific project focus on teacher training as a formal activity or as an informal activity?
- Could the specific project have some interesting – especially political and social consequences that make the project worthy of special consideration within our study?

|   |    |      |
|---|----|------|
| eLearning application   | 50 | 22 % |
| Blended learning concept                                      | 27 | 12 % |
| Support of eLearning processes                                | 31 | 14 % |
| Development of vocational profile (in relation to eLearning)  | 28 | 13 % |
| Application of eLearning in a particular subject matter field | 74 | 32 % |
| Relation to eLearning is difficult to establish               | 8  | 4 %  |
| Other   | 6  | 3 %  |

As we said in the foreword, the results of the first stage depend very much on the quality of the basic information and material that was delivered to us by the NAs and the Commission. This information was not adequate or complete in every case. The first stage of the survey is based on this information – which often was itself based on original project applications. Indeed the second phase of the monitoring, involving direct contact with the projects, revealed that this information was not always adequate or up to date and therefore our results have to be taken as only tentative and requiring further research for confirmation. The first results – as documented below – show that less than 32 % of the projects (12 % are definitely described as blended learning concepts) can be characterized as “blended learning concepts”, most of them involving the development of “special eLearning applications”.

Another important finding is that the Leonardo projects support mostly individual processes (67 %) and that just 26 % support social processes.

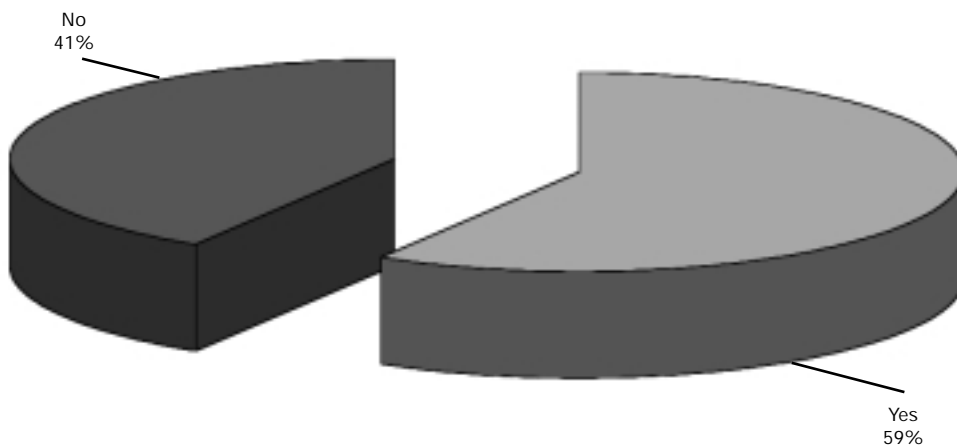
Which kind of processes are supported mostly in the eLearning project?



|                      |    |     |
|----------------------|----|-----|
| Social processes     | 27 | 26% |
| Individual processes | 69 | 67% |
| others               | 7  | 7%  |

54 projects (59%) were selected as probably having some interesting – especially political and social – consequences that make the project worthy of special consideration within the study.

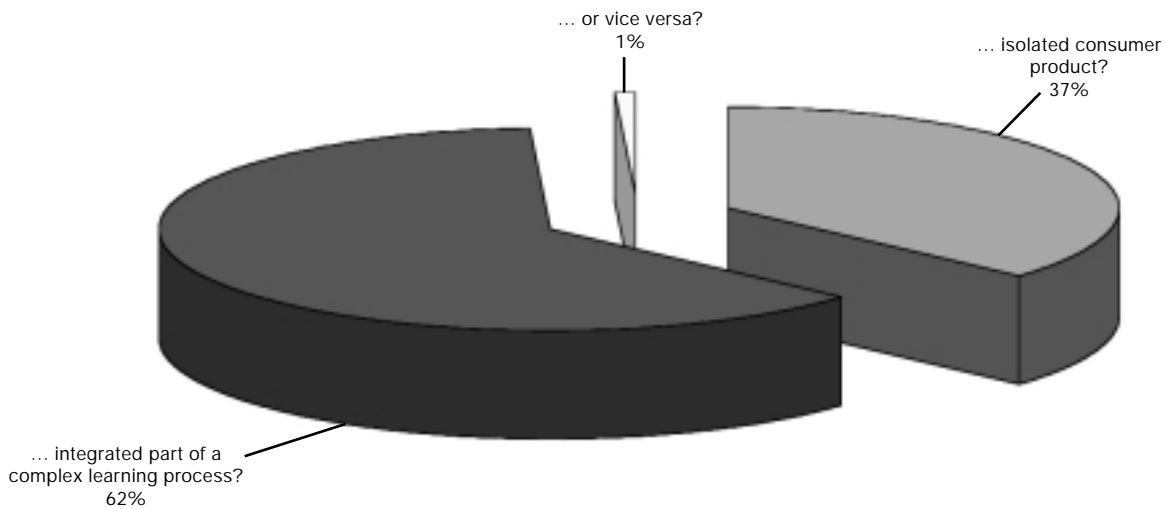
Could the specific project have some interesting – especially political and social – consequences that makes the project worthy of special consideration within the study?



|     |    |     |
|-----|----|-----|
| Yes | 54 | 59% |
| No  | 38 | 41% |

A number of other interesting results come out of this survey. Whilst not more than 12% of the projects are definitely described as blended learning concepts, most of the projects regard eLearning not as an isolated consumer product but as a more or less an integrated part of a complex learning process.

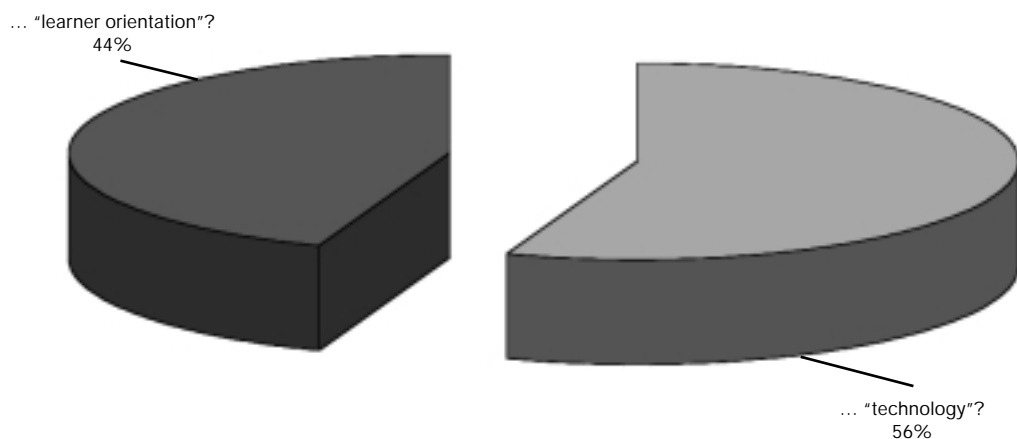
Is the understanding of eLearning in the special project one that regards eLearning as an ...



|  |    |     |
|--|----|-----|
| ... isolated consumer product?                     | 40 | 37% |
| ... integrated part of a complex learning process? | 68 | 62% |
| ... or vice versa?                                 | 1  | 1%  |

Concerning the question of learner orientation, our overview of the 149 projects showed that 56% were technology driven and just 44% learner driven. This implies most thinking on eLearning starts with what is possible through ICT and learner needs is a second or third consideration.

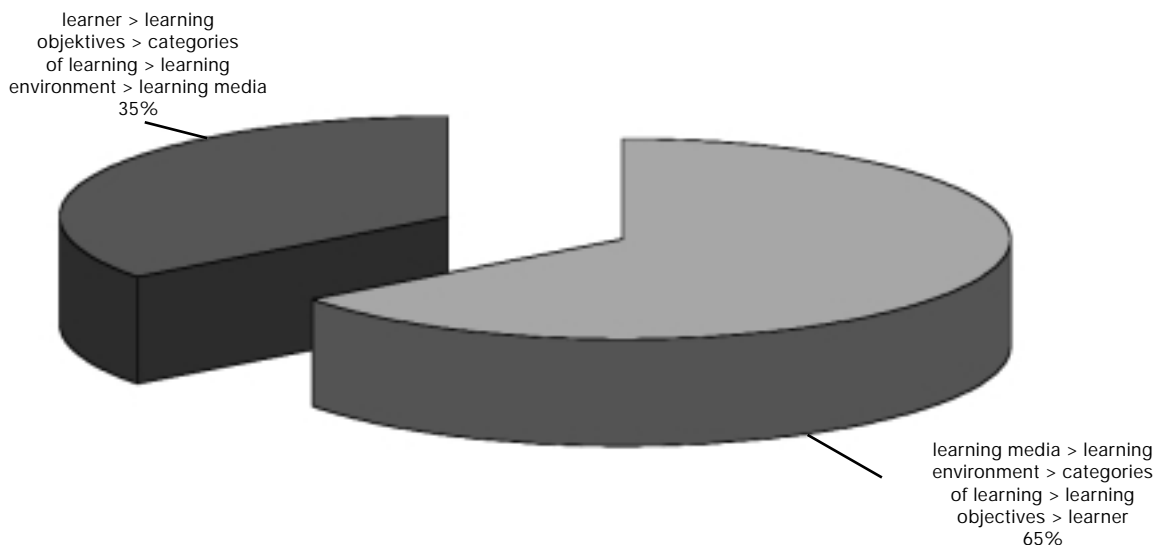
Can the idea of eLearning within specific project be characterized as driven by ...



|                            |    |     |
|----------------------------|----|-----|
| ... „technology“?          | 60 | 56% |
| ... „learner orientation“? | 48 | 44% |

That result is underlined by the question on the development schema. The development processes of 65% of the projects can be characterised by the chain of learning media – learning environment – categories of learning – learning objectives – learner and only 35 percent start the development process from the learner's needs.

Does the idea of eLearning mostly support a development schema which is characterized by the chain

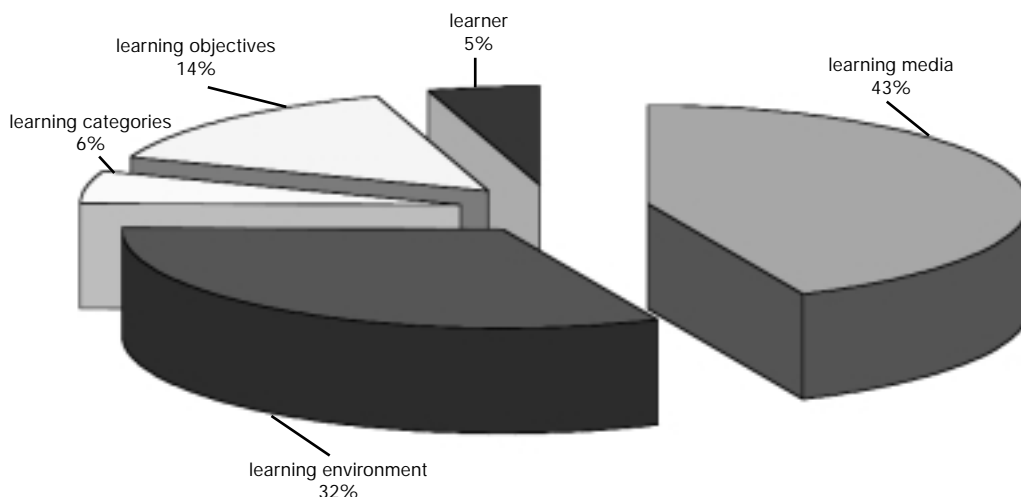


|  |    |      |
|--|----|------|
| learning media > learning environment > categories of learning > learning objectives > learner | 62 | 65 % |
| learner > learning objectives > categories of learning > learning environment > learning media | 34 | 35 % |

most attention within the project. 43 % of the projects focused firstly on the learning media and 32 % on the development of learning environments, whilst not more than 21 % were centred on special learning objectives and just 6 % on learning categories. Only 5 % of the projects gave the greatest attention to the learner within the eLearning development chain.

An additional interesting outcome is the answers to the question as to which elements of the chain receive

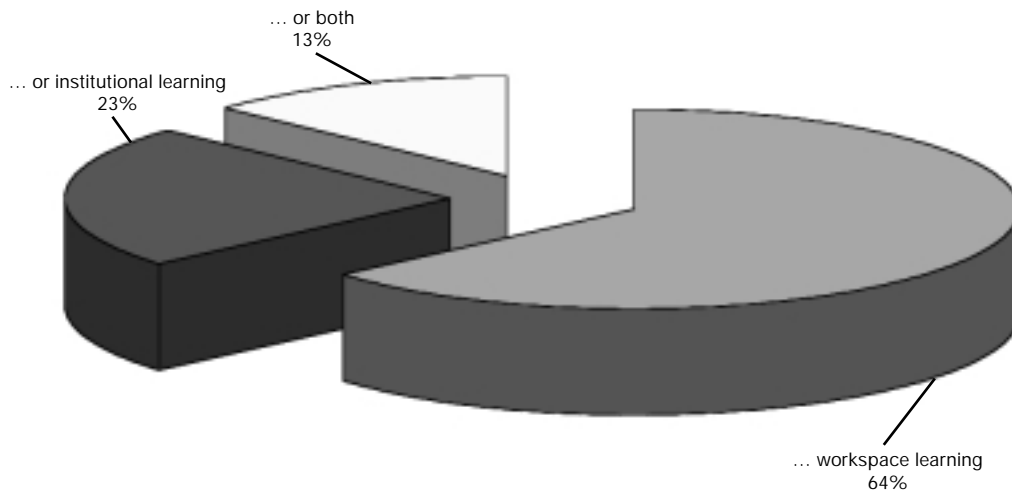
Which element(s) of chain receive the most attention within the specific project?



|                      |    |      |
|----------------------|----|------|
| learning media       | 63 | 43 % |
| learning environment | 46 | 32 % |
| learning categories  | 8  | 6 %  |
| learning objectives  | 21 | 14 % |
| learner              | 7  | 5 %  |

The next question was whether eLearning is oriented towards a "workspace" learning model, towards an "institutional" learning model, or towards both. The majority (64 %) were oriented towards workspace learning, with only 23 % focused on institutional learning.

Is eLearning in the specific project oriented towards ...

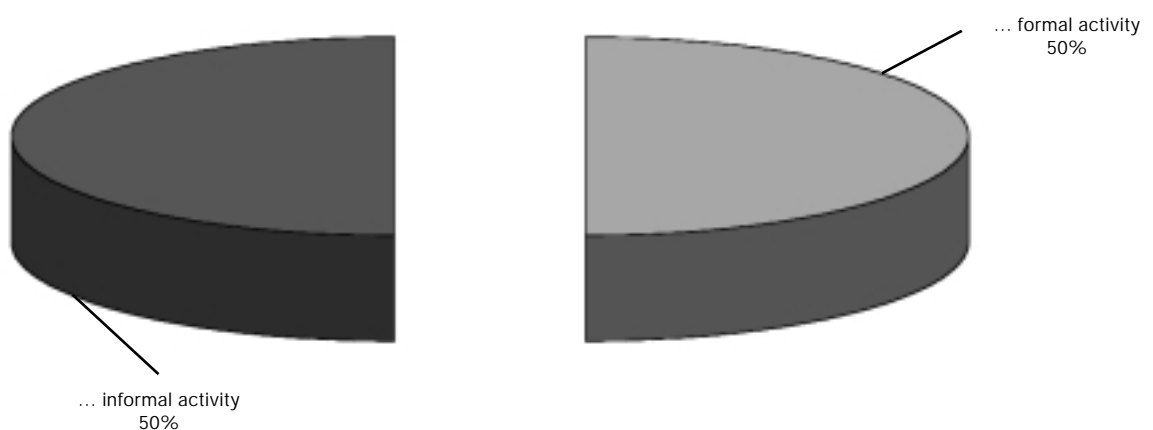


|                               |    |      |
|-------------------------------|----|------|
| ... workspace learning        | 68 | 64 % |
| ... or institutional learning | 25 | 23 % |
| ... or both                   | 14 | 13 % |

This suggests that projects promoters seem to be convinced that eLearning is a tool suitable for non-regulated, more informal learning processes where the principle of “learning anytime and anywhere” is most advantageous.

Given that during the last three to five years thinking on eLearning has increasingly focused on the role of teachers and trainers in the success of learning process, we looked at the approach of the projects to teacher training. 50 % of the projects focus on teachers training as a formal activity and the same percentage of projects on teacher training as an informal activity.

Is eLearning in the specific project oriented towards ...

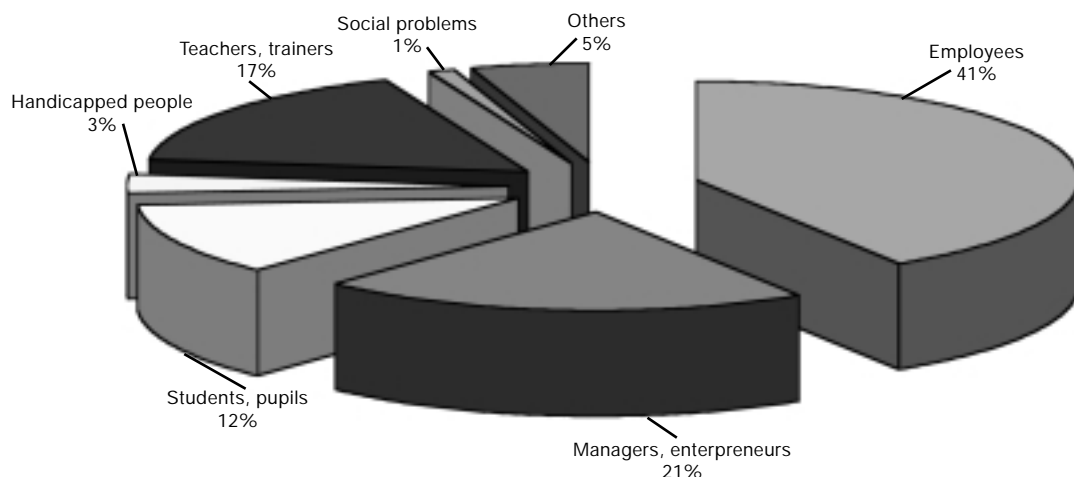


|                       |    |      |
|-----------------------|----|------|
| ... formal activity   | 27 | 50 % |
| ... informal activity | 27 | 50 % |

The project target groups

Employees seem to be part of the most favourite target group of the monitored Leonardo da Vinci eLearning projects.

## Leonardo da Vinci – Procedures B & C: Target Groups



41 percent of the projects are targeted towards these groups.

Other target groups for the eLearning projects are managers and entrepreneurs (21%), teachers and trainers (17%), students and pupils (12%).

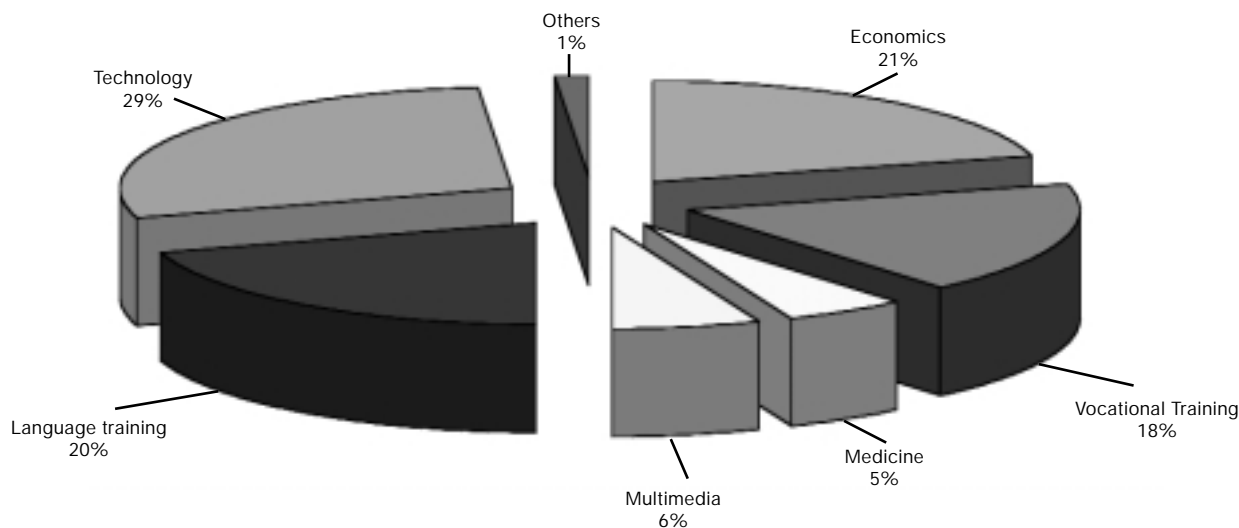
Amongst the managers, a particular focus is managers working in SMEs and managers of start-up companies, while the target group of students and pupils includes students in vocational training schools (for example in the German Dual System), and trainees preparing for a job.

Just three percent of the eLearning projects are focused towards physically handicapped people and less than one percent at those socially disadvantaged.

### Contents and subject fields

Economics and management (21% – including different commercial fields and at very different levels), training in technology (29% including training for engineers), language training (20% including language training for new target groups such as forestry workers) are the main subjects addressed by the eLearning projects.

## Leonardo da Vinci – Procedures B & C: Subject Fields



Medicine is a growing subject field (5% including programmes for education in first aid), targeted towards

doctors, nurses and medical technicians.

### 3.3 Emerging issues

In the next section of this study we provide an overview of the main issues in the development of eLearning at European and international level identified by members of the project team.

#### 3.3.1 Learner Orientation

We have already provided a short explanation of what we describe as learner orientation. The main idea of learner orientation is – in our point of view – that the development of learning processes using eLearning as a learning tool should start with the learner him or herself.

In other words: did the developers of learning processes succeed in the reversal of the technology-driven development schema shown below: Learning media > Learning environment > Categories of learning > Learning objectives > Learner.

Was it changed to a pedagogical/andragogical-driven development schema? Learner > Learning objectives > Categories of learning > Learning environment > Learning media?

The second schema requires primary consideration of the needs of learners, of the learner's learning biography, of the learner's aims in learning, of interesting learning content for the learner, of the question if eLearning is more motivating for the learner than traditional learning methods etc. This focus on the learner should lead to consideration of the following issues in developing learning systems<sup>10</sup>.

- learner oriented eLearning systems have to offer self-testing possibilities to the learner in order to find his/her position within the actual learning process;
- learner oriented eLearning systems have to be flexible and allow methodological variations for different learning groups;
- learner oriented eLearning systems have to offer an information platform to the learner to allow reflection

on the position within the learning process and the development of personal learning strategies;

- learner oriented eLearning systems have to take into account that the learning biography of each learner is much more important to the success of the learning process than the technological possibilities of steering any learning process;
- learner oriented processes, especially learning processes of adults, should allow the most possible flexibility regarding the individual aspects because the learning processes of adults are more or less self-guided processes.

#### 3.3.2 Categories of Learning

Categories of learning are an interesting criterion to judge whether a learning process or especially an eLearning process is successful.

Besides the categories of learning already mentioned (see chapter 2.4), characterized by the central aims of the learning process they support, mention should be made of two different main categories of learning. The first is formal learning and the second is informal learning.

Formal learning means regulated, intentional learning processes with clearly defined learning objectives and learning contents. Learning processes within the formal learning category are normally defined by institutions and teaching personal and often take place in special institutions and include certification. Informal learning can be described as non-regulated learning processes in which more or less situational, intrinsic learning takes place on an occasional basis. Informal learning processes can even be described as "purpose free" and include the hidden curricula. Informal learning is characteristic of learning in day-to-day practice at the workplace and as part of everyday life.

<sup>10</sup> Cf. Dichanz/Ernst:eLearning – begriffliche, psychologische und didaktische Überlegungen [eLearning – conceptual, psychological and didactic considerations]

## eLearning generations

| Decade | Type   | Concept of Technology                                  |
|--------|--|--|
| 1960s  | Computerbased training                         | automation   |
| 1970s  | Intelligentutoringsystems                      | automation   |
| 1980s  | Micro worldstools for production               | Toy, constructionmedia                                 |
| 1990s  | Computersupported Collaborativlearning         | Asynchronous tools communication and collaboration     |
| 2002   | Virtuel learningenvironments/ Blended learning | Multi modal infrastrucur synchron andsynchronous tools |

### 3.3.3 Learning Environments

Information and communication technologies have the potential to open a wide range of new approaches to learning. In a historical perspective we talk about different generations of eLearning:

In the 1960s, computer based training systems were developed based on an instructional paradigm. This approach was further refined during the 1970s with the inspiration coming from artificial intelligence. The aim was to develop an effective instructional technology based on an understanding of learning as the transfer of knowledge. In the 1980s, constructivist learning philosophy dominated and inspired the development of so-called micro worlds. In micro worlds, which are a symbolic representation of the domain, students can explore different types of activities and construct knowledge through interaction with the learning environment. This approach was further developed in the 1990s, when the focus moved from the individual learner towards collaborative aspects of learning. This approach of Computer Supported Collaborative Learning (CSCL) was taken up in the classroom and within distance learning. In the last years we have seen a tendency towards the merging of classroom based and distance learning activities in virtual learning environments, where the basic infrastructure is provided by multimodal and hypertext based asynchronous and synchronous tools. Blended learning is a mix of different technologies, face-to-face and virtual learning activities. New ideas of learning building upon social constructivism, socio-cultural theory and situated learning are emerging within this approach.

Whilst learning media represent one part of the learning environment, the other part of the learning environment is characterized by the learning field, where learning takes place: learning centre, learning group, workplace etc. Learning fields including the social environment at the workplace are important for the success of the learning process and new pedagogical research shows that a growing complexity in the learning environment helps stimulate learning processes.<sup>11</sup>

### 3.3.4 Development of new Learning Methodologies and new Learning Processes

Vocational education and training has traditionally, within the school, adopted an instructional approach to learning and the instructional paradigm has influenced different eLearning generations. Until the 1990s, the instructional paradigm was provided through different "stand-alone" media such as floppy discs, interactive videos, and CD-ROMs. With the emergence of the worldwide web, the instructional approach was adapted for the virtual learning environment and blended learning.

There is an issue as to whether eLearning will help transcend the instructional paradigm within vocational education and training and lead to the development of new learner centred teaching and learning practices building on the emerging movement towards social constructivism and situated learning principles. eLearning opens new ways of learning and may help to:

- integrate work based and school based learning;
- integrate theory and practice;
- integrate codified and tacit knowledge;

<sup>11</sup> Cf. Overmann, M.: Der Lerner und das Lernen in einer multimodalen Lernumgebung, [www.phludwigsburg.de/franzoesisch/overmann/baf5/5k.htm](http://www.phludwigsburg.de/franzoesisch/overmann/baf5/5k.htm), S.2 f., Ludwigsburg 2000 (Learner and learning within a multimodal learning environment)

- provide rich learning resources, including simulations and virtual reality;
- build up formal and informal networks of learners for the sharing of knowledge and meaning – across Europe and globally.

In this way eLearning has the potential to transform and to socially modernise vocational education and training.

### 3.3.5 Content and target group

Research suggests (Attwell, forthcoming) that where eLearning is taking place in the workplace, it is generally limited to white collar and technical and professional employees and in particular to those using new technologies. This finding is extremely problematic. The introduction of eLearning has been associated with the move towards lifelong learning and to a more inclusive approach to widening participation in continuing learning. But a recent Cedefop survey showed that eLearning was almost exclusively the preserve of just those groups who traditionally are already participating in continuing professional development.

The issue of supply and demand has resonance for involving wider groups in eLearning. The production of eLearning materials is largely dominated by the private sector. An examination of eLearning programmes on offer in Italy showed most were targeted at managers and technicians. Most materials are for technologies, mainly the use of standard software packages and networking technologies. Next is learning materials for managers and for management activities such as marketing and eCommerce materials followed by eLearning materials for language learning. Beyond this the provision is very limited. Obviously these materials are largely targeted at technical, professional and management employees (or white-collar workers). The situation is exacerbated in Europe by the question of language. eLearning was pioneered in Europe in the university sector. Most learning materials were provided in English. Whilst this may be acceptable in a higher education environment, most vocational learners require learning materials in their own language. The production of eLearning materials is an expensive and often risky, economic undertaking. It may well be that private sector material developers are unwilling to risk developing programmes for groups with little culture or tradition of workplace learning. Without such a culture there is no evidence that eLearning materials geared towards blue-collar workers would stimulate lifelong

learning and continuing training. This points to the need for a strategic policy approach to the development of eLearning in the workplace.

### 3.3.6 Development Strategies for Design

Many of the important decisions in eLearning development are taken by technical developers. Often, development strategies do not require pedagogic knowledge from eLearning developers in spite of the importance of an orientation towards technical or pedagogical innovation in the development process and in determining learner success.

### 3.3.7 Teachers and Trainers

eLearning requires new role models for teachers and trainers. The traditional academic mission of transmitting a closed body of knowledge from the standpoint of an undisputed expert is inadequate for ICT supported, open and flexible learning spaces. Teachers and trainers need to focus on co-operative knowledge construction, mentoring and preparation for individual, life-long learning, in order to realize the potentials of eLearning. In many countries *teacher training*, however, seems to be highly traditional with limited attention to ICT based methods. Many trainers in LEONARDO projects have to learn new skills, largely on their own. Another problem is that many of the learning environments are intended for use by adult learners who come to courses with a rich and varied reservoir of authentic life experiences that trainers could make use of. Moreover, these learners have to learn after-hours, in their spare time, often decades after leaving formal education. Therefore, it is the task of their teacher to (re)develop their *learning-to-learn skills* with special regard to eLearning methods, preferably before entering the course, to ensure a smoother acquisition of digitally transmitted knowledge.

Teachers in vocational education normally train students from their own country and culture. The international training programmes in the projects we surveyed need *cross-cultural teaching skills*, e. g. knowledge of the educational system and dominant pedagogical paradigms of the countries their students in distance education courses come from. They also have to be fluent *in a foreign language* (mostly English, as it seems to be the lingua franca of international eLearning programmes). These skills could be greatly improved by encounters with their peers from other national project groups - unfortunately, such large-scale mobility

cannot be financed under the present grant regulations. (other programmes, e.g. TEMPUS, can be involved but the organisation of two parallel international projects is more than our respondents were ready to undertake.

An excellent means of informal teacher training would be regional seminars to disseminate national best practice related to eLearning. Unfortunately, such workshops are rare to find. More common are conferences with 15 minute presentations unsuited to the presentation of new teaching methods.

### 3.3.8 Added value out of Cultural Differences and Transnationality

Cultural differences in projects result from differences in the economies of participating countries and their educational culture. The latter differences seem to be relatively minor, as paradigms of education are international and new eLearning models are disseminated in practically all the countries participating in the LEONARDO project. Transnationality can be observed in a universal effort to create *constructivist* (or constructionist) learning spaces that include interactive, personalised, student-oriented features. Even those projects aiming to develop commercially oriented courseware will ensure that learners' needs are evaluated in the preparatory phase and then incorporated in the course design. Good examples for this are the so-called *virtual laboratories*, because these shared, customisable, flexible to use and relatively easy to upgrade teaching environments are highly effective means of project-based, collaborative international learning activities. *Differences in economic systems*, however, result in different course content for the existing Member States and the accession countries. One example is *e-commerce courses*. A distinct group of projects have been initiated and are (partly) co-ordinated by accession countries and reflect the special educational needs of economies preparing to enter the European Union. A favourite theme of these projects is e-commerce – a topic much promoted by policy makers and multinational industrial and commercial companies but received with much reservation in societies having experienced decades of close state supervision and control. E-commerce is not just technology, it is also a special communication culture based on trust and fair exchange of information, money and goods. Projects aiming to develop e-commerce courses should not only teach the technological and advertising requirements of this novel type of trade. They also have to help their students (owners and employees of firms considering

the launch of e-business activities) to establish a culture of fair commerce. Thus, these projects directly facilitate the creation of a unified European commercial space and monitor – and through this, help avoid or solve – some important economic problems accession countries will face after integration.

### 3.3.9 IT-Standards and Open Source

The issue of standards has been much discussed for a number of years, but with little practical resolution. The lack of agreed and applied standards leads to a number of severe problems.

The first is interoperability. eLearning materials produced by one project, developer or content provider will often not work on another platform or programme. Despite the advantages claimed for information and communication technologies in providing access to materials at any place or at any time, without agreed standards for interoperability this will not happen. Secondly, the lack of interoperability means that Europe is failing to develop the critical mass of high quality learning materials needed if eLearning is to be mainstreamed. Thirdly the lack of standards is increasing the price of production and preventing competition of quality. Finally the lack of agreed standards prevents transparency in terms of the quality, target group, level and so on of the learning materials and is thus a barrier to take up, particularly by enterprises.

Open Source Software (OSS) is a second, and related issue. Open Source is a term used to describe software developed and licensed through one of the many variants of the General Public Licence (GPL). This licence states that any user can freely access the software and further develop and change it. However, in so doing they must attach the same licence to the new software. In order to qualify for the GPL developers must make the source code of the software freely available. The Open Source Movement, of which Linux is the best known programme, has expanded dramatically in the last five years. The advantage is that it allows rapid and collective development through a community of developers and allows small and micro businesses to participate in large scale developments.

On the other hand there are a number of economic and juristic questions in using OSS. A recently published study of the German Software Society (VSI)<sup>12</sup> describes the risks to users and developers working with OSS,

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<sup>12</sup> Spindler, G., *Rechtsfragen der Open Source Software*, VSI (Hrsg.), München 2003 [Legal questions of Open Source Software]

because users as well as developers are not legally bound. The development of different software modules in different countries could cause different legal claims on the developers as a result of unsolved legal and technical questions.

### 3.3.10 Evaluation – assessment and validation

Many projects are still focused on issues of delivery, rather than the content and its effective use in the learning and/or training process. The advantages or disadvantages of the electronic delivery of learning contents are not sufficiently discussed and evaluated. Assessment and validation is often ignored, or scheduled for the later part of the project.

Some institutions and companies that have invested in eLearning claim to have gained, through lower costs, the ability to impart larger amounts of knowledge than through traditional methods of training, more effective management of the learning process, and increased staff satisfaction and retention. On the other hand many organizations seem to be disappointed on their investment in eLearning.

The problem is that there remains a great deal of uncertainty as to how to measure the effectiveness of eLearning.

### 3.3.11 Partnership

To be successful with eLearning projects, the construction of the partnership is fundamental. This could be on one side the generator of innovation and creativity and on the other side the generator of disappointment and demotivation.

Too many partners could be observed using too much energy for management instead of using it for the project development itself. If partners do not work reliably the time-table of the project will be endangered day by day. A further problem is that often there are changes in staffing over the lifetime of a project. Other problems could occur if the expertise of the partners differ too much or do not fit.

## 4. The second Phase Results

The main part of the second phase of the thematic monitoring consisted of interviews with twenty-five selected projects (selected at the end of the first phase by the experts). The experts undertook and documented the interviews (five interviews by each expert). The main results of the interviews have been integrated in the following chapter and have been central to developing the recommendations for action at the end of this report.

### 4.1 Examples

To give a clear impression of the interview results and the main ideas and questions discussed with the project coordinators the next section provides a summary of five of the interviews.

#### Example 1

The reason for the selection of this project is its relevance for the needs of participants and its pan-European aspect. ECommerce is a flourishing trade in

Western Europe whereas it is only beginning to gain a foothold in the Eastern Europe. This project brings together Eastern and Western European partners to help create an e-commerce training portal to be used by beginners and more experienced actors in the field of electronic trade. SMEs are the major target, but the learning portal is robust enough, and materials are developed in a flexible, modular way, to be used by larger companies as well.

The promoter of the project is a professional association focusing on the protection of the interests of actors in industry and commerce. It has previous experience in using and developing teaching materials for information and communication technologies. The promoter felt the need for educational expertise (most other project organisers do not) and hired a local staff of experts. They are partly commercial company staff members, partly researchers and professors from the local Teacher Training College with a university degree in ICT and/or education, and were given the task to

research, design and program the learning platform and the course modules. Amongst the international partners, the German partner is the most important, because it has experience in blended training and the level of teaching programmes developed by this institute meets EU requirements. Secondly, they have the technical and personal infrastructure needed for the project's success.

At the core of the project is an eLearning philosophy based on the belief that the strength of the eLearning process is the facilitation of self-governed learning. At the same time, however, the promoter says that we should take into consideration that this type of learning requires a higher level of preparation and previous learning experience which is not possessed by everyone. Some learners need guidance and external control of the learning process and can only achieve good results if these factors are present. Therefore, the most important mission of the project is to develop a "learner-friendly" space. The design and co-ordination of the learner support system should provide for real learner needs and ensure the utmost help in the learning process. No state-of-the-art knowledge base can fully substitute for an experienced guide (substituted by electronic guidance, e.g. guided tour) and the carefully elaborated continuous/optional learning support system.

The project uses a flexible, open learning environment that is equally applicable for individual, pair and group work. Modules are offered through a menu and learners can select according to their needs. Major innovative aspects are introducing eLearning as a new educational technology for all stakeholders in the project (partners, test-companies, target groups for dissemination); introducing eBusiness for these target groups; elaborating a technically advanced curriculum content focusing on the practice of eCommerce.

#### Example 2

The project deals primarily with the effective and innovative use of web and interactive TV "Anytime-Anywhere" technologies for technology supported vocational training. Its main goals can be summed up as follows:

- The integration of existing or emerging digital TV standards (e.g. TV Anytime), MPEG-7 and education standards (such as SCORM) in order to propose a unified standard for vocational training using digital TV Anytime-Anywhere technologies.

- The development of novel methods and eLearning solutions for the pedagogical use of integrated web and interactive TV Anytime-Anywhere technologies.
- The development of curriculum and training facilities for professionals and/or students in the field of digital TV Anytime-Anywhere technological solutions, standards, tools, applications and technical / legal issues of IPR/digital rights management.
- The involvement of interactive TV facilities for personalisation of learning and its tailoring to individual learning styles.

The new competences of the target group members will contribute to their adaptability for the labour market in the digital economy and to the creation of new business opportunities in the audiovisual industry. Furthermore, the characteristics of time independent, interactive and personalised access to broadband training information, taking into account the current trend of convergence of web information and broadcast information, constitute a simple, efficient and cost-effective approach to vocational training.

A related theme of the project is the *Development of Skills within Companies, particularly SMEs*. The project should offer an attractive solution for companies, especially those with limited resources, like SMEs, for the enhancement of the skills of personnel in technology areas.

#### Example 3

The overall goal for the project is to create teaching and learning models and methods for distributed collaborative project learning. The pedagogical approach is collaborative project learning supported by lectures, tutorials and laboratories. The main aim of the project is to give students opportunities to apply theories and methods in practice, and to strengthen the dialogue and collaboration between vocational education and working life.

Most of the work is organised on-campus, where web-based tools support project learning and the management of the learning process; however, there is also a focus on having the students participate in distributed collaborative learning environments, where students work together in cross-institutional and international learning communities.

**Special learning activities and learning environments:**  
The project develops pedagogical models based on

learning resources and the communication infrastructure. Students carry out the majority of the work in small teams as part of their "industrial training". The work is organised as design projects with specific learning phases, roles, deliverables, peer reviews and other process tools. The learning environment has been designed on the basis that all educational organisations have their local specific learning platforms that cannot be easily connected. The project provides customized tools to set up the collaboration space and link into the local learning environment. For the learners the tools provide access to project related information resources and project and team management support. For the teachers and tutors, web-based management tools are provided to support the establishment and implementation of network based project learning. The system is composed of a common core and a set of selectable tools. They are available on multiple server platforms, including Linux and Windows.

**Innovation and transnational issues:** It is difficult to differentiate the added value of the technology and the innovative aspects of the learning arrangement. "The development of the new collaborative project based learning environment would be very difficult to develop without technology. In the case of one partner it has totally changed the way they teach. It was an unknown methodology – and the authorities didn't allow the teachers to give the students credit for participating in the course...however, now the management has seen the strength of this approach, and it has led to change in the curriculum and in the methodology...it has furthermore been an added value to see how this approach may be used in mass education. There are more than 200 students in one special case."

**Barriers and sustainability:** The cross European perspective has been very important – both between the teachers and as an exchange of ideas on methodological questions. The integration of the different pedagogical approaches and the change at institutional level have been the most challenging issues. Also practical obstacles related to the different scheduling of the academic year have to be taken into account.

The project would like to make the tools available as "open source", however the partners do not have sufficient Research and Development facilities for this work.

#### Example 4

The "Supply Chain Management in the Music Industry across this Internet" project, supports creative independent organisations and individuals throughout the music industry supply chain. It is developing eLearning tools that can be accessed through fixed and mobile communication devices, for example a diagnostic tool kit and a range of online learning applications, designed to stimulate personalised learning. The project aims to have a wide impact on the creative industry.

The project manager has a background in the use of technology for learning but also has wide experience in the acquisition of funding and in project management. He describes funding for projects as "providing windows for new ideas".

The project is developing a series of diagnostic tools. The tools are designed to develop user profiles which are fed into an informal learning environment. The tools are a "hybrid environment combining learning based" on education theory together with skills based creativity management.

The main tool is the Creativity Assessment Tool (CAT). Through a series of short assessments, the software generates a profile for each user that can be used in a Virtual Learning Environment and/or by a mentor, tutor or trainer. The Web based tool is intended as a motivational application that provides a "road map" for learning and creativity through capturing our imagination and emotions. The Virtual Learning Environment is a collaborative learning solution designed specifically for the creative industries. The aim is to support individuals working in a creative sector through providing a learning solution that is both suited to their expertise and desires as a learner. The design approach is based on encouraging learners to share information and interact in online learning communities through a collaborative and open style.

The project is based on a "strong social agenda towards non traditional learners" and on a belief in the value of informal learning as part of a Lifelong Learning agenda. To that extent the project focuses on developing tools to enhance learning creativity and is "play oriented and diagnostic". The project is "pitched at the margins for whom traditional learning environments are failing". "Diversity with out equality equals oppression", says the project manager.

The social background of the learners was one of the main driving motivations behind the project, in extending learning opportunities to learners who do not participate in traditional learning, be it face-to-face or online. Therefore, the project has focused on the development of informal learning and on learning which can take place outside educational institutions. At the same time the target towards learners within the music supply chain led to a focus on creativity and creativity management, taking account of the background and learning preferences of those working in the music industry.

The transnational partnership has been critical for the projects' development. Most of the partners are small and micro enterprises within the music supply chain industry. They include two kinds of SMEs: "traditional companies and those at the volatile end of the music industry". However despite the obvious problems such volatility might bring they are "living and interesting".

#### Example 5

The project focuses on a learning-arrangement consisting of a didactical concept, web-based solutions and eLearning modules allowing remote working with virtual laboratories, workshops and real working-places in the field of mechatronics. This is seen as an important step for realizing the concept of "Virtual-reality eLearning" within a particular subject field.

eLearning or even blended learning – in the classical sense characterized as web-based training – is limited in scope because learning experiences are limited to working within virtual situations. That is why a learning concept following the idea of mixed reality could promise new learning perspectives and could go much further than Blended Learning.

Mixed Reality is the connection between virtuality and reality in order to develop better interaction through technology in everyday environments and processes. Within a learning process there should every time be a connection to the real world (for instance by remote systems to real, remote systems) in order to facilitate a process of learning from reality by learning from direct experiences. This allows combinations between workplace-oriented learning and cooperative learning and it is the idea of the project to combine learning processes of different learning groups at the same time. One interesting aspect is that in this project the didactical medium is at the same time a part of the working process itself.

In this sense, learning can be described as a process for acquiring information and processing experience in which the learner selects and constructs knowledge that is useful and appropriate for him/herself and in turn uses this to drive and determine his/her own continuous learning process. Learning thereby becomes an individual process of interaction between the individual and his/her environment, in which the subjective reality of the learner is actively constructed by the learner.

An important innovation within this project is that concepts and examples for real working and learning are developed and accessed virtually through remote processes. These concepts support the social aspects of learning, as learning is necessarily integrated in communication processes between different learning groups while working at the same machine. Within special situations (in correspondence with reality) role-plays between the different learner groups and learners who have already acquired some basic qualifications as users will take place. In this way the learners will have the additional opportunities to develop their communication skills (also interculturally).

## 4.2 General findings from the second phase

In the following chapter we will provide the findings from the interviews carried out in the second phase and draw attention to possible additional emerging issues. First of all we notice that at least three categories of questions have been the most fundamental, problematic and interesting and characterise the thinking within the projects.

These categories are:

- the philosophy of learning and learner orientation
- training the teachers
- evaluation

When we asked about the learning philosophy behind the project we often obtained answers explaining in detail the technical infrastructure of the learning environment. One of the many answers illustrates this.

The learning philosophy behind the project "was to investigate the usability of mobile devices as a paradigm for just-in-time/anyplace/anytime learning – say on a train or in a situation when a short amount of time is available." This statement shows very clearly that this project is really driven by technology, because

the learning philosophy is closely associated with technical solutions. Within these technology-oriented projects the main interests are focused on developing sophisticated applications and whilst elaborating a learning philosophy may still seem necessary, it is apparently not a focus for most LEONARDO eLearning projects that aim, for instance, at developing ICT based learning platforms.

While our questions concerning the special philosophy of learning have often been answered in a very technological way, there have been far fewer projects focussing on the necessity of a clear eLearning philosophy addressing, for instance, the categories of learning (is learning just acquiring information or more? – does it reflect on formal or informal learning?) or special learning objectives.

To give one more example: it could be guessed that intercultural problems (besides any questions of project management) would arise in discussions of education systems and in trying to create a common understanding on learning. Concerning this aspect it is surprising that this problem was hardly mentioned. One possible explanation could be that the problem may exist but that it was not realized while not focussing on learning and the philosophy of learning.

As discussed later another issue is the training of teachers and trainers. Not every project accepts the necessity for the training of teachers and trainers.

The third weak point of several projects seemed to be their understanding of evaluation as shown in the next sections.

The following section presents some concrete findings.

### **Learner Orientation**

When discussing questions of learner orientation and learner integration in the project development, a common answer was that learners are invited to test the environment to provide feedback in order to improve the project results. Learners do not usually “co-develop” – they test and react.

Learner orientation, in its strongest sense, means to start with the learner (his / her needs, his / her learning biography etc.) before starting to design a learning process for eLearning. The influence of the learners themselves in designing new learning processes often seems unclear. Concrete experiences in the learning

behaviour and learning objectives of the learner are not a focus for the process designers. Thinking on pedagogical innovation is seldom mentioned when the project coordinators talk about the starting point of their project. Instead, research into special target groups is sometimes used, methodologies and contents and other general information is mostly gained from companies and institutions where the learners are working and/or learning. To say it more bluntly: too many of the projects started through a fascination with the possibilities of new technology and not because of their enthusiasm in designing innovative pedagogical processes based on a clear understanding of the learners' needs.

There exist good examples: we have seen projects that focus directly on the individual learner and take the individual learner biography into account with the purpose of developing methods and materials meeting the particular needs and the characteristics of the user groups (cf. also the eLearning generation intelligent tutoring systems). Other projects use high-level methods in order to make the user needs analyses. Examples are educational programmes which have been developed together with companies and trade-unions. One example is “The Employee's Role in the Future Labour Market”, which has been developed in Denmark. The model, which is claimed to be the first of its kind, is an analysis tool which can determine the employees' specific needs for re-training. The model can create the basis for new educational and re-training patterns for many people.

Other models are based on generic development processes, where the continuing feedback loops provide the input for the revision and further development of the eLearning environment.

### **Media Orientation**

Several projects have been dealing with the issue that multimedia (video, audio, graphics) and hypertext structures (links) offer potential for different learner styles and offer possibilities for developing learning resources in new ways. Out of this, some projects are interested in the further development of the technical aspects of multimedia tools and hypertext, while others focus more on interface development, e.g. the development of good design metaphors. Other examples of technical development are projects focusing on video-records via IP streaming, or video-conference transmission from educational events.

## Categorising learning

A growing number of projects are working on eLearning processes which can be described as informal learning processes. Others try using eLearning as a key element to combine formal learning (mostly within learning institutions) with elements of informal learning, using "reality" as an important part of learning. A German project on eCommerce is trying to bring "reality" to school with the help of "virtuality".

eLearning, understood as mixed reality virtual learning, seems to open the chance to combine elements of formal learning with elements of informal learning. To summarize: the eLearning projects monitored give the impression that they support two main tendencies. One is to support informal learning processes and the other is to support processes with formal learning elements as well as informal learning elements.

Whilst most of the projects refer to formal learning or informal learning, categories concerning the objectives of learning processes are not often mentioned or are unclear. This is probably a result of the lack of consideration of the necessity of developing or defining a transparent philosophy of learning.

## Learning environments

Not the only – but a very interesting – example of a learning environment in the modern sense is the example of a virtual learning environment designed as a collaborative learning solution specifically for the creative industries, which uses adaptive technologies to embrace our imagination and emotions. The focus is to support individuals working in a creative sector through providing a learning solution that is both suited to their expertise and desires as a learner. Users are presented with training separated into knowledge components that meet their unique learning preferences through illustrative movies, videos, audio clips, text, or as downloadable documents. The design approach is based on facilitating learners to share their own information and interact in online learning communities in a collaborative and open style.

All the eLearning projects demonstrate a huge variety in learning environments. The tendency is towards virtual learning environments based on the concept of blended learning with a content-management system as a communication infrastructure, or so called mixed reality systems where real remote systems are combined with a virtual laboratory etc. There are many variations. Example for technological learning environment:

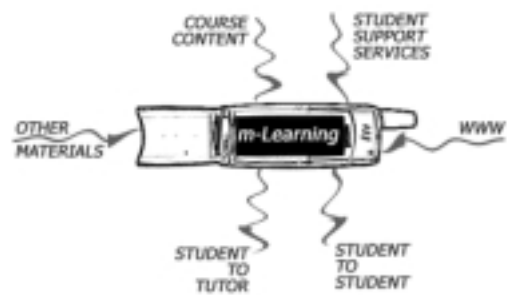


Figure 1: Wireless Virtual Learning Environment of Tomorrow (source: <http://learning.ericsson.net/leonardo/thebook/chapter1.html>)

Constructivist (and constructionist) learning approaches are dominant, however they also influenced by the instructional paradigm. Within the projects, we saw some interesting new emerging paradigms of collaborative learning like the example described as follows:

The learning environment has been organized around a virtual city metaphor – in a 2D representation. The city<sup>13</sup> has been fully developed with streets and squares, e.g.

- Trade Street (business to consumer, business to business, e-commerce etc.)
- Service Square (business service, ICT-service, industry service, ecology service, environmental-service, e-service etc.)
- Tourism Street (transport centre, tourism office, information centre, e-tourism etc.)
- International Square (languages and culture, e-events etc.)
- Hospitality Street (hotel management, f & b management e-catering etc.)
- Civic Square (public administration, information centre, Job Centre, EU-relations, e-administration etc.)
- Professional Street (accountant, lawyer, estate-agent, consultant, e-consultant service etc.)
- Financial Street (bank, savings bank, building society, e-finance etc.)
- Union Street (member service, training of trade union representatives, union insurance system counselling, e-union service etc.)
- Education Square (vocational training, upper secondary school, higher education, adult education, re-training, eLearning etc.)

In this virtual city, the learner can be inspired to participate in workplace related educational programmes, attend self-directed instruction and coursework as well as participate in learning communities.

<sup>13</sup> see the virtual city at [www.educityeurope.dk](http://www.educityeurope.dk)

In many examples, the learning environment provides shared resources. An example is a project building on integrated web and digital TV Anytime-Anywhere technologies. The environment contains four local centres of expertise. The environment is supported by a distributed repository (multimedia database) of information resources and re-usable training materials, standards, technical/ legal issues, innovative eLearning applications etc.

Another project is systematically developing experience and tools to support collaborative, project based learning. The collaborative aspects take place locally in project work – but also cross-institutional and international project work takes place. The learning environment has provided a great number of new tools and procedures: *e.g.* for peer review, for managing the project work, remote laboratories.

Another project illustrates the mass-potential in the instructional approach to eLearning. 75.000 employees are being up-skilled as ICT users. Self learning centres have been established in the production hall and in offices, and a learning intranet has been established, so employees can access the learning resources from their homes. The employees can use working hours to train in skills for work. For personal use, the learner has to use his/her spare time.

#### Developing new learning processes

The projects demonstrate a huge variety in the added value of eLearning. Most of these findings are not based on strict evaluations – some projects mention that it is in fact too early to measure the effect – however, there are many experiences of added value. Below we will mention some of the most common, and also add some new ones.

#### eLearning:

- It facilitates access to learning not only for all categories of employees by developing the educational offer but also for immobile persons
- It increases learning opportunities
- It stimulates the learning process by using the flexible learning concept
- It brings learning and learners closer together
- High quality and relevance of training programmes. The materials get better.
- Decision makers can benefit to a higher degree from the training when it is workplace related and can be planned as an integrated part of the job
- Independence of time, place and speed gives the

possibility of individualised and differentiated learning

- eLearning has helped in the shift from a teacher centred model (lecture, notes, examination) towards a learner centred model (problems, literature, information, investigation, discussions). This paradigm shift started within education after "The Independence", however eLearning supports this change of direction"
- There are other ways in which the use of IT supports the learning process:
- The formalisation of the learning process may help companies to gain a general view of the planning of strategic development of competencies
- The browser based evaluation system allows continuous evaluation in order to reach the best practice
- The virtual city metaphor is an interesting new metaphor for developing virtual vocational learning environments.
- To this we can add the benefits of collaborative project work:
- That eLearning makes the management of project based learning much more effective
- The size of the class or the basic group can become much bigger, there is an example of more than 200 students doing project work in small groups
- The scaffolding process of the students become more easy and efficient
- It provides the possibilities for making international projects
- It may offer disabled people new opportunities for supporting processes of social integration
- It offers new problem solving oriented approaches.

Some projects are developed on pedagogical basics for learning as the basis for creating new learning processes. As seen in Example 4, described above, the central attributes of eLearning are described as a social process as well as an individual process. Within this project the learner has the chance to learn with the help of an individual road map while the learning takes place in a team-oriented collaborative eLearning process.

"Persons with different cultural background benefit from partners' cultural values."

Another project adds an interesting perspective to the use of eLearning as a tool for updating professional qualifications. Within the Cardiology Professional Society, eLearning offers doctors a way to keep updated in the latest knowledge and treatments in cardiology. It is designed for the individual doctor, to be

used flexibly, when he or she has spare time. For this professional society, eLearning is a natural addition to the other services offered: Guidelines, Surveys, Journals and Congresses. The society already has the mechanism to provide the knowledge for the eLearning system. The eLearning approach is based on a self-directed learner model, a sort of "micro world" built around cases. When doctors work on the cases, they have access to see what their peers are answering or suggesting. They are not told what is right or wrong, but they can look up what others have been doing.

### Content and target group

As pointed out in the section on emerging issues, many projects are dealing with the training of white colour workers and managers, however, we do see interesting examples of other target groups.

One example is taken from the automobile industry. Here we see examples of eLearning used to up-skill 75,000 employees in ICT – both on the shop floor and in the office. And as the project leader explains: "In the old days, we could only teach 75,000 participants if we had a lot of money, classrooms etc. Now we are not afraid of dealing with this huge group."

We also see new ways of keeping up professional qualifications for white colour workers. On the one hand, we see virtual learning environments stressing collaborative and community building processes. On the other hand, we see projects focussing on re-certification and specific training for people with higher education.

For managers, there is an example of a project focussing on setting up distance learning programmes, specially eLearning programmes, which benefit SME managers in saving time and space. The materials will be designed for the most critical phases of development of new enterprises and facilitates their future development.

The survey of project target groups shows that those people who are already thought to be privileged in access to learning form again the biggest group of those who are foreseen as eLearners. That is why we should be sceptical, or not draw wrong conclusions, of evaluation reports that find no correlation between access to eLearning and the social background of learners.

### Teachers and Trainers

Teachers have a more challenging job when eLearning is implemented – that is (or could be) the good news. The bad news is that teacher training seems in many projects to be the weakest feature – even within high quality projects .

Those who are thinking about the role of teachers and trainers, consider the role will change following the implementation of eLearning: "We have to get away from the idea that the teacher is the source of all knowledge. It is important, if we are working with learners at work that many different sources of information and knowledge are acknowledged. The role of the teacher or trainer is to check and advise on the validity of the knowledge."

But not all projects stress teacher training. In fact some projects seem to have "forgotten" the teacher – or said in another way – they design the eLearning system for the learners, and do not integrate the role of the teacher. This seems to be obvious in the following example where the project co-ordinator found the question asked of training for teachers and trainers "not applicable": The aim of this project is not to provide new teaching skills – he said – but to set up a new and highly sophisticated learning environment. The evaluator, however, supposes that the teachers for whom the lab was intended for use in vocational schools will experience significant difficulties when they start using the environment without preparation. New educational methods are called for that may not have been taught at the teacher training colleges.

The reality is shown in that several projects explain that they maybe have underestimated the need for teacher training!

In many projects teachers are looked on as facilitators and guidance professionals. As teachers shall play new and different roles, teacher training is also practised in different ways.

Teacher training does not need to take place as formal training. In some projects teacher training took place informally, through the teachers being the participants and developers of the new teaching and training methods. That gave the teachers experience with the new way of working – handling blended learning techniques together with community building support strategies. However, in order for this method to be

effective it is important that the teachers get technical and professional didactical support in order for them to progress without wasting their time. When it is well organised, the result is more enthusiastic teachers who strongly support the exploration and development of new teaching and learning methods.

#### **Added value of cultural differences and transnationality**

Even learning approaches are internationally bounded. We see in the projects examples of cultural diversity that are both compelling and on the other hand challenging. And we also see examples of how the interaction in the Leonardo project demands and /or leads to institutional reforms:

“Concerning the IT competencies, each country had different starting points and that was a kind of barrier at the beginning of the project, but also a very interesting and challenging period. For Romania the IT results of this project bring a whole new approach to the way to acquire knowledge and competencies, which calls for innovation in formal curricula and in learning methods outside the formal system.”

“Because of the different cultural backgrounds it took some time to find the common place and a common understanding of the project. Just because of the different cultural and pedagogical backgrounds in the project, both managers and employees have established international relations and networks, and gained new experience within cultural understanding and pedagogical methods in other countries. The transnational work gave the opportunity to discuss and exchange ideas, which can give inspiration for development of new work.”

“We can name many of them (added value): the possibilities to know more and better about the vocational education and counselling system in partners countries, exchange of ideas and experience of partners, widening international co-operation”. This statement is supported by another coordinator: “The added value of the transnational part is materialised in the exchanging of competencies in order to obtain products with a high degree of validity at a European level.”

On the other hand the results of looking at the added value of cultural differences may even lead to one more question. Why is not heard very often discussions on different ideas, possibilities and theories of learning and

of national learning philosophies? Is this lack of discussion to be interpreted as a consequence of not thinking of the problem of formulating a learning philosophy accepted by all of the partners followed by an applicable common learning model?

#### **Standards and open source**

One project is dealing with the combination of existing or emerging technological and education standards, as well as existing or emerging standards in digital TV in order to propose a unified standard for vocational training and with the perspective to also contribute to the ubiquitous delivery of training material to anyone and everywhere at any time.

Another project is using a commercial platform and provides that platform for the partners. They have developed a Course Development Kit, which partners can use to develop very flexible modules. The development is based on open standard tools (XML) in order not to be too dependent on one single platform.

Very often we hear of the necessity of technical standards. The lack of a common standard increases the costs for development as well as for implementing eLearning. The missing standards are one reason why eLearning is, or will be, invented again and again.

#### **Evaluation**

It would be wrong to say that evaluation does not take place within the projects, but it would also be wrong to say that evaluation is a strongly structured or well organized process within each project. Sometimes it seems that the projects are conscious of the necessity of evaluation, but that the responsibility of evaluation is delegated to every single project partner with the result that the overall evaluation process gives the impression as being not really steered but accidental. On the other side, evaluation of eLearning projects start in some cases very late, not to say too late, to have a real influence on the projects' success.

One question and one answer, which seem typical of many eLearning projects may illustrate the purpose of evaluation. The project coordinators have been asked whether eLearning made (makes) teaching and learning better or not. The result can be described in many cases by the honourable answer: “I don't know. I don't think you can say that, however you can say that it gives new possibilities.”

The findings from the interviews indicate that evaluation has different meanings: the evaluation and monitoring of the project management, the evaluation of the teaching and learning process, and the evaluation of the product. In all cases it seems as if there is no systematic evaluation methodology. Only few projects refer to a standardized evaluation model, *e.g.* Quality Management methods, and one project is using the EFQM model from the CEN/ISSS workgroup on quality in Learning Technologies.

### Partnership

There are different models for partnerships. Some are very integrated and based on the idea of a common and shared conceptual foundation, others are divided into specific work tasks with a clear division of labour between the partners, *e.g.* one partner taking care of the technical design, another partner taking care of the didactical design, and other partners running the pilots. All the projects have to fulfil the EU criteria on partnership.

Cultural diversity is highlighted in many projects, however, we also see examples of how this cultural diversity means extra work for the management of the projects:

"Because of the different backgrounds it was necessary for the promoter to make extra visits to the partners to help them start up the process of using the Learning Management System. A benefit from this was that there was created a more joint understanding of the idea of learning in virtual environments."

Cultural diversity may challenge the partnership, especially in projects which want to develop an integrated approach to eLearning.

Some projects have started to use a common platform as their basic communication infrastructure, however nearly all projects stress the importance of face-to-face meetings in order to coordinate the activities, continuously evaluate the stage of the project development, to discuss controversial issues, to agree decisions, to review current state of development, to share and exchange experiences, to get together in different groups including development, design, evaluation, to set up structured teaching and learning activities for each other, and to get some understanding of the cultural context and conditions.

## 5. Recommendations for Action

At the end of this report we will draw some first conclusions based on our investigation of the Leonardo da Vinci eLearning projects over the last five months. The aim is to propose recommendations for action for future Leonardo da Vinci programmes for eLearning in the field of vocational training.

We are convinced that eLearning has changed in the last few years. Many people, and institutions, organisations, and companies, have realised that after the first technological hype, eLearning development has to concentrate more on the learning process itself and focus on learner needs.

We have examined many different projects – many of which follow a technological approach – but we have also observed projects with an intensive orientation towards learner needs. Most of the following recom-

mendations are based on examples of good practice from these projects.

Some of the projects, despite producing promising results, display inconsistencies and are facing some problems in implementation. We believe the integration of teachers and trainers in the project could be of benefit in these cases.

The issues to be resolved in the future are not really technological problems. We have to solve traditional problems concerned with learning if we want to make eLearning processes more successful. This involves a focus on three main weak points:

- Learner orientation/philosophy of learning
- Training the teachers
- Evaluation

**Recommendation No. 1:**

A clear understanding of what we are talking about when we discuss eLearning is needed.

This clear understanding of eLearning itself and the different issues around eLearning is needed to avoid the many misunderstandings which arise.

As an example, when we take the European Commission definition of eLearning as a basis, why is it necessary to use the terms "eLearning" and "self-learning" as different aspects of learning? Why are terms like eLearning and mLearning used at the same level of definition? Is it not right that mLearning is just another technical aspect of eLearning?

We also became aware that the "hype" around eLearning has led many project promoters to designate as eLearning any project using ICT connected to education and training – however lose the connection! Very few projects explore all the possible aspects of eLearning, whilst in the later projects (2002) it can be seen that a deeper understanding of the possibilities of eLearning were recognized and utilized in the project outputs.

**Recommendation No. 2:**

Programmes aiming at eLearning should be based on the idea of learner orientation

To underline this recommendation we would like to refer to an example from Ireland. The idea behind this project is to give learners pedagogic choice through the use of eLearning. The project is geared towards the needs of learners in SMEs. In particular it recognises that different learners will have different learning styles and approaches to learning and aims to allow flexibility in pedagogic techniques to take account of different social backgrounds and learning needs. Additionally, the project partners are conscious of the very different cultural backgrounds of learners. "We have to make sure the tools are sensitive to these backgrounds and will work in different cultural settings". The project has built in the funding to generate different language versions.

Some projects adopt a constructivist approach: the learning programmes invite the learner to choose a topic of interest, conduct experiments, draw conclusions and compare existing (archived) information with their current findings. In science and technology educa-

tion, ICT is used in so-called virtual laboratories (computer simulations, animations, etc.) as well as in "real" laboratories (computer supported measurement, computer controlled devices). There are examples of this approach in a number of different subjects and areas including mechatronics, laser technology and medicine.

The recommendation of facilitating more projects with a clearer learner orientation also includes the necessity to postulate in a clear way that the needs of the learners have to be determined in more concrete manner before starting the project (even before applying for a project). This includes awareness of the learning biography, of individual learning styles and of social needs.

This also includes the need to develop a clear and transparent learning philosophy behind the project.

**Recommendation No. 3:**

Projects in eLearning have to document a clear and transparent learning philosophy which determines the main direction of the project.

This includes the necessity to discuss the different learning philosophies between the transnational partners at an early stage of project development. Otherwise, because of the different learning cultures in different countries, problems can arise in the future dissemination and implementation and it can affect project sustainability.

To develop a learning philosophy implies a clear decision on learning categories, including the general learning objectives (is learning just a process of acquiring information or is it more?) or the formal framework and context for learning (formal learning, informal learning or both?).

**Recommendation No. 4:**

Projects in eLearning should train the teachers and trainers

Support for teachers has to include the use of new technologies as well as the pedagogical aspects of teaching, training, coaching, moderating etc.

Teaching science, technology, economics, medicine etc. needs a teaching and learning approach that is as close to the "real world" as possible. This can only be achieved with appropriately trained teachers competent in their own subject area, trained in the use of modern

learning technology and also trained in methodological and didactical processes.

Although all the projects surveyed aim at teaching new skills and abilities, and invest considerable finance and labour in developing innovative learning environments, we found *few examples of pro-active teacher / trainer development programmes*. This was the weakest side of many of the projects we looked at. Learning platforms and digital teaching aids are described at great lengths – mostly in technical terms, with regard to professional content – but it is hard to identify any educational philosophy that the training of future trainers could be based on. Most platforms include interactive components but requirements for mentoring and coaching, monitoring student progress and providing individualised feedback are limited. As most projects are in their preparatory phases, measures to develop a *professional community of trainers* can still be made.

Teachers' training is needed because even at the highest level, *university and college staff members are inexperienced in adult education*. University professors with decades of teaching and research experience turn out to be unsuccessful and frustrated when teaching on-the-job courses. Course design for distance education is a set of skills that should be mastered even for highly qualified staff.

Even those with a natural talent for educating adults will face *technical problems* when cutting-edge technology must be used. For example, video conferencing requires totally different presentation methods than normal lecturing. Special training is required to develop illustrations and devise a suitable structure for such sessions. Technology develops rapidly, so trainers need ongoing updating.

National Agencies should organise informal training events for teachers participating in the Leonardo projects, but the projects themselves also must cater for their own special training needs.

**Recommendation No. 5:**

Design and development of project aiming at eLearning should include a focus on pedagogy and communications.

As some projects prove, the development of new pedagogies ideas within eLearning environments is not

a futuristic scenario. As example 4, based in the music industry shows, eLearning processes that support the learner's individuality as well as their social needs within learning processes can be developed.

Development strategies for eLearning processes are mainly determined by different ways of thinking. The postulation that design and development of programmes aiming on eLearning should be pedagogically oriented, means, for example, that in creating development strategies the following questions need to be taken into account:

- If and how will the learners' needs be established?
- Is it our main objective to make the learner learn or to motivate the learner?
- How will the learning biographies of the learners be taken into consideration within the development process?
- Will there be attention to the social aspects of learning?

eLearning development is mostly determined by technical developers. Development strategies have to be based at on a basic knowledge of pedagogy. Pedagogical innovation will help more to make eLearning more successful for the learners than the use of the latest technology. To help overcome this problem, it is important that different groups of participants take part in the design and development process. These groups should include learners, teachers (pedagogues), designers, ICT specialists.

As there is a need for these groups to work together, communication is important in the design and development process.

ICT developers need to explore pedagogical innovation and those who do not wish to do so should not take part in such projects. That could help in that new project applications will emphasize educational innovation and reward pedagogic practice.

**Recommendation No. 6:**

Projects aiming at eLearning should regard evaluation as one of their most important tasks.

Referring to the findings on evaluation described in chapter 4.2, it is important that evaluation has a central role in the project. Interim results can be helpful in developing and determining future activities and influencing positively the project results. To fulfil this work, projects have to consider:

- what to evaluate (the social and cultural needs, the learning process, the learning environment, the management)
- how to evaluate (learning circles, effect evaluations, self assessment), and
- the perspective of evaluations (global and European perspective, SME, educational institutions and the learners).

Moreover:

- evaluation has to start from the first day of the project
- the responsibility for evaluation has to be clearly defined, not forgetting that the project coordinator has a special responsibility which cannot be delegated
- one part of this special responsibility is to lead the steering process and to take care that evaluation is not accidental.

To strengthen the evaluation activities the Leonardo programme may consider offering systematic guidelines and tools for evaluation activities, which can be used by the projects.

#### **Recommendation No. 7:**

Projects aiming at eLearning should widen target groups and exploit new contents whilst using innovative pedagogical ideas.

The evidence from the Leonardo da Vinci programme suggests that many projects are targeted towards managers. Many of them also focus on language learning or on new technologies.

Important future topics for the Leonardo da Vinci programme include new models of eLearning and the training eTeachers and mentors.

To widen the target groups and to exploit new contents for eLearning requires a growing pedagogical competency within the projects, whilst one of the central problems of many projects can be described as an almost complete lack of educational expertise.

However, there are some projects focused on less traditional or emerging occupational areas lacking traditional training programmes – e.g. medical technicians and the music industry – and these projects seem to be very successful.

One feature of these projects is that they appear to have undertaken more in-depth needs analyses than those projects geared towards more traditional target groups.

Secondly, they appear to have a clearer focus towards developing pedagogic approaches synergistic with the learning styles and cultures of members of the groups. Thirdly, a number of these projects have focused on capturing and developing informal learning or learning in informal contexts.

It may be that the Leonardo programme should encourage exchange between these projects with the aim of producing a guide for the development of pedagogies for the use of ICT for learning.

#### **Recommendation No. 8:**

Projects aiming at eLearning should reflect on new partnership models that allow more energy to be spent in developing common ideas and contents instead of spending too much energy on management and bureaucracy.

Many projects are complaining of the administrative and financial procedures. Some find the procedures overwhelming, especially given the size of funding. Others are complaining about the procedures having changed during the life-time of the projects, and others again that the focus is wrong in concentrating on technicalities instead of the innovation and experience of the projects.

In line with this, some projects suggest a more open and experiential approach and that there should be possibilities to fail. As in good learning processes, the projects should have more room for experimentation.

Another problem seems to be the number of partners within a project. As we are convinced that Leonardo da Vinci projects working with fifteen or more partners need too much energy for project management – to the detriment of developing a learning philosophy, of developing of new contents, of undertaking more structured evaluation etc. – we suggest that the Commission makes clear that not only is there a minimum number of international partners but also a maximum number that should not be exceeded.

Concerning the development of eLearning processes, partners with real and different competencies who are able to work together in a real complementary way are more important than the number of partners.

Besides this, the management of the projects should be supported by the NAs to establish robust infrastructures and networks for teaching and learning between projects. Some projects suggested the NAs should give more political support in order to make cooperation between project partners and state-owned institutions and organizations easier to realize and to manage. In some countries, e.g. the Nordic countries, where the number of projects within each country is too few to build up a network among the projects, a network could be established on a regional basis. These networks could even be designed as a learning community taking into use the advantages of ICT, shared communicative infrastructure, learning philosophy on cultivating communities etc.

**Recommendation No. 9:**

Projects aiming at eLearning should reflect the need to generate sustainable results and their dissemination is one important tool to support sustainability.

Programme and project development needs to be sustainable. Courses should be revised and updated every year. There is little evidence it ever happens. One way for this to happen, is to anchor courses and programmes in the education and training institutions. Monitoring of projects two years after completion would reveal the financial, personal and political implications of sustainability.

One project stated that the main barrier to sustainability is access to Internet at an acceptable price for all target groups. Another project said it was difficult to communicate with SMEs. The NAs could help to provide a broader infrastructure for the projects.

The short term nature of programme and project funding needs reviewing.

This is an absolute necessity to use the projects for long time capacity building. The first project phase could be seen as “experimental” and for developing a shared learning philosophy and conceptual basis; the second project phase would be for “consolidation and institutional integration, and the third phase for “operation” and phasing out of funding from Leonardo. The length of these phases may vary for individual projects.

Models for growing and spreading new practice must be developed. This aspect is missing from most international funding procedures. A dissemination strategy

for LEONARDO is badly needed. A central website (learning portal) featuring best practice with links to sources would be helpful. However, as stated above, it is also possible to use ICT in a more ambitious way, and to create a dynamic learning community among the projects and the NAs. The goal of such a dynamic learning community could be to make it easier for the projects to learn from each – to exchange information and knowledge – in order not to repeat the same mistakes, and in order to build on the knowledge of each other. However, as we have learned from this monitoring you have to design learning communities (share projects, repertoires, mutual engagement, cf. Wenger, 1998). It is not sufficient just to offer a content management system (the technology).

**Recommendation No. 10:**

Programmes aiming on eLearning should reflect on the possibilities of the development of Open Source software and of standards

There are a number of standards and standard groups. The IEEE Learning Objects Metadata Standard and the US derived SCORM standard have made some impression in the last two years. Yet there remains grave doubts about the validity and applicability of these standards. Essentially they are technical standards and fail to take account of learners or content, let alone the different national and regional cultures. Research into localisation of eLearning programmes and materials (Blandin, forthcoming), suggest these are some of the most important factors in developing eLearning to meet learners needs.

It may well be that the European Commission should undertake an initiative to encourage and facilitate the development and implementation of standards which meet the needs of learners, developers as well as learning and teaching providers in Europe.

If the legal questions of using and developing OSS will be clarified at an international level – especially in the EU – reducing risks for users and the developers the promotion of Open Source could dramatically change the face of eLearning in Europe. Some project promoters we have talked to through the thematic monitoring project have suggested that all ICT based projects under Leonardo da Vinci should be required to make any software produced with public funding Open Source. Even if this was deemed impossible, the Leonardo programme could encourage cooperation

between projects aiming at Open Source, develop repositories and exchanges around Open Source developments and take initiatives to promote Open Source software for learning.

Having solved the questions mentioned above, course materials developed by a Leonardo sponsored project should be shared – with appropriate legal provisions – in an organised manner. A space on the Leonardo web site should be used as a descriptive catalogue of existing

programmes with contact addresses, demonstrations and URLs. Parallel developments could be avoided if an up-to-date, searchable list of available materials and materials under development were available.

However it has been pointed out that not every developer wishes to make the software available through Open Source: "After having spent thousands of working hours on a sophisticated learning platform you cannot normally require free sharing!"

## 6. Conclusion

To be successful with eLearning in the future, we should be aware that designing new eLearning software and creating new eLearning technologies is not the highest priority: the main efforts in the future should focus on designing more intelligent learning processes. As a result of the individualisation of learning objectives and learning processes, these intelligent learning processes have to be based on a more constructivistic and less on a cognitivistic or even behaviouristic learning philosophy. That does not exclude the fact that sometimes we do need a behaviouristic approach or a cognitivistic approach in special learning situations but this means that in looking at eLearning in general we should aim at more constructivistic approaches.

Those "intelligent learning processes", for example, have to take in account:

- the individual learning objectives of the learner
- the individual and social working and learning situation of the learner
- the individual learning biography of the learner
- that the learners have to be responsible for their own learning process and that eLearning should not take this responsibility away from learner

The learner orientation we are demanding also means that the Leonardo projects have to work more together with their target groups. We could see in many projects there was too little involvement of the project's target group during its development. The involvement of the target group in the development process will help to create more motivating learning processes. – This includes bringing learning to real life – which will help generating more motivation.

In this sense, projects dealing with approaches like experience based learning, experimental learning, action-oriented learning and project learning should be sponsored with the highest priority.

We are convinced that eLearning will be an increasingly normal part of everyday learning and that eLearning and knowledge management will continue to be overlapping processes with little final process differences.

As eLearning will just be a normal tool within intelligent learning processes teachers do not have to feel threatened by this new technology. What will change is the traditional role of the teachers: they have to be more the managers of learning processes who decide when and which learning tool should be used instead of being just a learning tool by themselves. To promote the necessary change of the teacher's role, the Leonardo projects on eLearning should never forget to train and prepare the teachers for their new role as managers of learning processes.

For future Leonardo projects, it would be very helpful to produce a hand book based on our experiences in the second phase of Leonardo laying out guidelines and helping to avoid the constant reinvention of both basic principles and tools.

## 7. Final Remarks

### 7.1 Added Value of Thematic Monitoring

The purpose of the Leonardo da Vinci thematic monitoring is to analyse the projects in order to indicate how and to what extent they address issues and challenges in the area of eLearning. Thematic monitoring should help to define which themes are not sufficiently covered by current projects and to provide recommendations for follow up activities.

The Leonardo National Coordination Unit in Ireland has recently held a start up meeting for all the funded projects in Ireland. Tim Hall recognises "a great potential for synergies and overlaps in the way we are doing things and in our different clients groups. It would be very interesting to find out the direction and objectives of other projects in eLearning and to find ways of sharing. There is strong potential for building future partnerships for the EU Framework programmes".

Colin Roberts says "We could develop a potentially large network working around training for medical physics. Also radiographers need training in ultrasound. Other partners and projects could address different training needs in this field. We cannot lead everything ourselves but we can provide a methodology. It would be very helpful if the Leonardo programme could bring people together before projects are submitted at a sector level. We have projects that work and a vast world wide market. In the UK there are only 1000 medical physics technicians but just to train them is a vast effort".

These statements indicate that there is an interest among projects for the Leonardo programme to help to develop and facilitate a stronger learning community. Such a learning community could help projects to share ideas, experiences and knowledge on learning approaches, subject matters, and also on models for the management of projects, training of tutors and teachers, and on evaluation. Furthermore such a learning community might also be a means of establishing stronger links between the development part of the projects and research (both participatory research and fundamental research on eLearning), and it might help the projects in the process of establishing sustainable relations to companies.

There are certain principles which constitute a learning community: a shared enterprise, mutual engagement, and that the community develops a shared repertoire of "language" and conceptual framework. The Leonardo Programme cannot design this engagement, however, the Leonardo programme can help in the process of building up such a community through building structures and stimulating the process of participation and reification of the learning process. If the Leonardo programme does try to build such a learning culture, it is very important that the projects not experience this as a new bureaucratic burden, but as an exciting community where projects really learn from each other and gain added value from participation.

### 7.2 Dissemination of the Report's Results

We would like to express our conviction that it would be worthwhile and beneficial that additional publicity activities will be undertaken.

These could be conducted by the team members in conjunction with their regular work activities, such as providing links to the project results from their own homepages on the World Wide Web, or offering the report for download from these sites.

Furthermore, the best practice projects could be included in the German-Austrian Project Database.

In addition, the project results can be offered as an internet download from the various NAs.

Last but not least the ideas and findings should be presented at relevant conferences, such as the IT Training Conference in Bonn in November 2003 and the LearnTEC in Karlsruhe in February 2004. Given the significance of the undertaking, it is further suggested that Peter Littig submits the results of this study in response to the call for papers for the ASTD (American Society for Training and Development) conference to be held in 2004. – Peter Littig presented the idea of the study and the interim results via video conferencing in May 2003 at a conference in Tampere/Finland. At the LearnTEC 2003, in Karlsruhe, he presented an overview of the thematic monitoring concept and the first draft of

guiding questions for the study. Additionally he reported on the first results of the interim report on the "Personalmesse 2003" held in Frankfurt/Main, Germany in June 2003.

Prof. Lone Dirckinck-Holmfeld will report on the results at Leonardo Conferences in Lisbon (September 2003) and Copenhagen (November 2003) as well as she will be reporting the findings in a Danish publication within the Consortium on Workplace-related Learning organised by Learning Lab Denmark.

DEKRA is planning to conduct a press conference (in coordination with and if possible with the participation of the European Commission) in Brussels in autumn 2003.

Every expert, as a member of the monitoring group, will support the dissemination by reporting on the results in his or her country or in other countries. Each team member has already considered possibilities for publishing and distributing the results of the study in cooperation with their individual NAs.

We hope that the results of this project will be considered as the foundation for establishing a thematic network throughout the community (and beyond) regarding the topic eLearning, a direction the project members are willing to support.

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[www.educityeurope.dk](http://www.educityeurope.dk) (see the virtual city)  
<http://learning.ericsson.net/leonardo/thebook/chapter1.html>  
[www.ucalgary.ca/cted/elearnwww.vlab.unitbv.ro](http://www.ucalgary.ca/cted/elearnwww.vlab.unitbv.ro) (virtual laboratory)

Survey on LEONARDO DA VINCI –  
Procedures B & C

eLearning

| No.                 | Title   | Organisation  | Content                                 | Target Group                          | NA |
|---------------------|---|---|---|---------------------------------------|----|
| A/01/B/F/NT-124120  | TENVORS - Network for Life Long Vocational Learning for Sustainable Regional Development            | LKT Laboratorium für Kunststoff-technik GmbH  | Technology                              |                                       | A  |
| A/01/B/F/LA-124100  | Logos Galas - Hypermediale Sprachenkompetenz für integrierte Kulturlandschaftsentwicklung in Europa | Universität für Bodenkultur Wien, Institut für Wildbiologie und Jagdwirtschaft  | Language training                       | Forestry                              | A  |
| A/01/B/F/LA-124106  | Follo.www - Foreign Languages for People Working with Wood  | Österreichisches Institut für Bildungsforschung der Wirtschaft  | Language training                       | Wood industry                         | A  |
| A/00/B/F/PP-124000  | Virtuela - Virtual EuroLaser Laboratory   | Argelas - Arbeitsgemeinschaft für Lasertechnik  | Technology                              | Laser technicians                     | A  |
| A/01/B/F/PP-124137  | Comet - Computer Aided Training in Measurement and Metrology  | Vienna Universität of Technology, University Extension Centre   | Technology                              | Scientifics, Technicians              | A  |
| B/00/B/F/LA-110337  | Leonardos Multilingual Engineers Project - Multicultural Communication in Europe (LEOMEPE-MULTI)    | Limburgs Universitair Centrum   | Language training                       | Engineers                             | B  |
| PP/-110339          | Telecoaching  | VIZO (Viaams Instituut voor het Zelfstanding Ondernemen)  | Business economics; business management | Manager, Consultants                  | EU |
| B/01/B/F/PP-110370  | Mentor-C  | Katholieke Universiteit Leuven (KULeuven)   | Technology                              | Engineers                             |    |
| CZ/01/B7F/LA-134016 | International Logistics through Language Modules and eLearning                                      | VOS A SOS Gustava Habrmana  | Technology                              | Logistics                             | CZ |
| CZ/01/B/F/LA-134057 | Deutsch im Maschinenbau   | Vysoké učené technické v Brne   | Language training                       | Engineers                             | CZ |
| CZ/00/B/F/PP-134013 | Development & Piloting of Basic On-line Training Courses  | University of West Bohemia in Pilsen  | Multimedia                              |                                       | CZ |
| D/02/B/F/PP-112609  | VITA  | Textiles & Flooring Institute GmbH (TFI)  | Textilbereich                           | Industry, Trade, Education institutes | D  |
| D/02/B/F/PP-112615  | Marvel  | Universität Bremen, Forschungszentrum Arbeit, Umwelt, Technik   | Technology                              | Trainees, teachers                    | D  |
| D/02/B/F/LA-112694  | Tellright   | ChIC, Charité International Cooperation, Medizinische Fakultät der Humboldt-Universität Berlin  | Language training                       | Doctors/nurses                        | D  |
| D/02/B/F/PP-112693  | Water in Paper  | Staatliche Akademie der bildenden Künste Stuttgart, Studiengang Restaurierung und Konservierung von Graphik, Archiv- und Bibliotheksgut | Technology                              | Conservators                          | D  |

|            |  |  |   |   |   |
|------------|--|--|---|---|---|
| PP/-112106 | Transnationales Pilotprojekt zur Integration von Warenwirtschaftssystemen und E-Commerce in die Berufsausbildung von Kaufleuten im EinzelTrade | Carl-Severing-Berufskolleg für Wirtschaft und Verwaltung der Stadt Bielefeld             | Business economics; business management | Commercial employees Trade                | D |
| PP/-112132 | Bedarfsgerechte Qualifizierungskonzepte für Existenzgründer durch Nutzung neuer Informations- und Kommunikationstechnologien                   | Bildungswerk des Allgemeinen Unternehmensverbandes Neubrandenburg e.V.                   | Business economics; business management | Start ups                                 | D |
| PP/-112216 | The international development of teleLearning products in virtual circles  | Berufliche Fortbildungszentren der Bayerischen Wirtschaft (bfz) gGmbH, Bildungsforschung | Adult education                         | Education institutes                      | D |
| PP/-112279 | E-Business-Support im Verbund Nutzung betrieblicher Personalressourcen zum Kompetenztransfer in KMU  | Überbetrieblicher Verband Wiesbaden-Rheingau-Taunus e. V.                                | Business economics; business management | SME-Managers                              | D |
| PP/112352  | European E-Commerce Assistent  | Gesellschaft für Bildung und Technik mbH der Industrie- und Handelskammer zu Münster     | Business economics; business management | IT-Specialists, enterprises, universities | D |
| PP/112417  | Qualifikation e-Coach / Entwicklung einer europäischen eLearning-Didaktik  | Deutsche Angestellten-Akademie e. V.   | Adult education                         | Teachers, trainee                         | D |
| PP/-112426 | Die Europäische Stadt als innovativer Lernort  | Internationaler Kulturverein - Sprachakademie e. V.                                      | Language training                       | Works committees                          | D |
| PP/-112440 | E-commerce in vocational Training - development of teaching units and practical use  | Bezirksregierung Hannover - Dezernat 405 / Berufliche Bildung                            | Business economics; business management | Trainees                                  | D |
| LA/-112444 | Mehrsprachige Kommunikation mit Notfall-Leitstellen  | Vereinigung zur Förderung des Deutschen Brandschutzes e. V.                              | Language training                       | People working in First Aid centres       | D |
| PP/-112451 | Modulized virtual learning about international e-logistics of goods  | INFO-Neuss GmbH - Institut für Berufliche Fortbildung GmbH                               | Technology                              | Logistics                                 | D |
| PP/-112504 | Creating an online course to promote interculturality for trainers   | Volkswagen Coaching GmbH   | Language training                       | Trainers                                  | D |
| PP/-112511 | Virtual corporate Learning about Electronic-Commerce   | greco: Transferstelle  | Business economics; business management | VET                                       | D |
| PP/-112516 | Web-Content-Manager: Erstellung eines europäischen IT-Profiles und seine Implementierung in den nationalen Systemen der Berufsbildung          | CDI Deutsche Private GmbH für Wirtschaft GmbH  | Business economics; business management | Teachers, trainers                        | D |
| LA/-112542 | Neue Wege im Fremdsprachenlernen für Euro-Betriebsräte und Gewerkschafter  | Deutsche Angestellten-Akademie Institut Brandenburg-Ost                                  | Language training                       | Works committees, students                | D |
| NT/-112544 | Forum for Alternating Chemical Education   | Europa Fachhochschule Fresenius GmbH   | Technology                              | VET                                       | D |
| PP/-112548 | Kundenbindung, Service und Controlling im E-Commerce   | Zentralstelle für Berufsbildung im Einzelhandel e. V. (zbb)                              | Business economics; business management | Trade                                     | D |

| PP/-112550           | Qualification course for technicians in the field of telecommunication and digital speech-processing   | Fachhochschule Dortmund   | Technology                                 | Electricians, electronic industry | D  |
|----------------------|--|---|--|-----------------------------------|----|
| PP/-112563           | Promoting Environmental Management in Hospitals (a tool for web based distance education and information exchange)                                   | Institut für Umweltmedizin und Krankenhaushygiene<br>Universitätsklinikum Freiburg                                    | Medicines                                  | Hospitals                         | D  |
| D/02/B/F/PP/-112613  | Optigas  | Gewerbliche Lehranstalten<br>Bremerhaven (GLA)  | Technology                                 | Trainer, Teacher                  | D  |
| D/02/B/F/PP-112622   | INNO-Start   | Landesinitiative Neue Kommunika-<br>tionswege Mecklenburg-<br>Vorpommern (LINK MV) e. V.                              | Technology                                 | Trainees                          | D  |
| D/02/B/F/PP-112662   | EUKOM  | Lehrstuhl Qualitätsmanagement und<br>Fertigungstechnik Friedrich-Alexander-<br>Universität Erlangen-Nürnberg          | Technology                                 | Metrology                         | D  |
| D/02/B/F/PP-112674   | E(CO)-Qualify  | EQUALITA, Institut für Qualifizierung<br>und Vernetzung in Europa e. V.   | Business economics;<br>business management | Managers                          | D  |
| D/02/B/F/PP-112696   | SIMON  | Wirtschaftsakademie Schleswig-<br>Holstein-rechtsfähiger Verein kraft<br>staatlicher Verleihung                       | Business economics;<br>business management | Managers                          | D  |
| PL/02/B/P/LA-140050  | Agrotourism-focused language course of<br>English and German Language for Public<br>Administration Staff from Rural Regions                          | Wyższa Szkoła Humanistyczno-<br>Ekonomiczna w Łodzi (Academy of<br>Humanities and Economics in Łodz)                  | Language training                          | Administration                    | PL |
| PL/02/B/F/PP-140056  | Towards Development of the European<br>Network of Continuing and Postgraduate<br>Education for Family Physicians                                     | Polish College of Family Physicians   | Medicines                                  | Doctors                           | PL |
| PL/02/B/F/PP-140069  | Postgraduate e-government and e-business<br>on-line study (e-study platform)   | WSHE - Wyższa Szkoła Humanistyczno-<br>Ekonomiczna w Łodzi (AHE - the Adademy<br>of Humanities and Economics in Łodz) | Business economics;<br>business management | Officials,<br>administration      | PL |
| DK/00/B/F/PP/-111006 | The European Virtual City for Education<br>and Training  | Erhvervsuddannelses Center Nord   | Adult education                            | Employees,<br>trainers            | DK |
| DK/00/B/F/PP-111017  | The social pedagogical workers retraining<br>to MediaGuide   | Jyds Paedagog-Seminarium  | Adult education                            | Social education                  | DK |
| DK/01/B/F/PP-111101  | e-Future-Development, Testing, Evaluation<br>and Dissemination of an Innovative<br>e-Business course aimed at SME needs<br>of e-skills in the future | Chamber of Commerce and<br>Industry of Herning-Ikast-Brande   | Business economics;<br>business management | SMEs                              | DK |
| DK/01/B/F/PP-111120  | Teacher qualifications in the knowledge<br>society aimed at the woodworking industry -<br>teak wood  | Skive Technical Institute   | Adult education                            | Wood industry                     | DK |
| EL/01/B/F/NT-114343  | Bios and environment transnational network   | Uetip Action Link / Action Synergy S.A.   | Adult education                            | ecology                           | GR |
| EL/PP/2002-114002    | Reportstag-E: Electronic Scientific Centre<br>for Added-Value Journalism   | Text & Color  | Adult education                            | Journalists                       | GR |

|                     |   |   |   |                                |    |
|---------------------|---|---|---|--------------------------------|----|
| EL/00/B/F/PP-114019 | Remote Medical Education via Internet Enhanced Services   | Datamed S.A.  | Medicines                               | Doctors                        | GR |
| EL/2000/B/P-114033  | Epicuros - a virtual learning environment for medical doctors in remote areas   | University of Ioannina (UOI)  | Medicines                               | Doctors                        | GR |
| EL/2002/B/F-114064  | eNSTRUCT - Preparing the new generation of instructors  | University of Piraeus Research Centre (KEPP)  | Adult education                         | Teachers                       | GR |
| EL/00/B/F/PP-114146 | Development distance training courses for SMART Buildings Energy Management - SMART BE  | Technical University of Crete - Department of electronics and computer engineering                                    | Technology                              | Engineers                      | GR |
| EL/2000/B/P-114186  | Entrepreneur  | Chamber of Evia   | Business economics; business management | Young entrepreneurs, start ups | GR |
| EL/2002/B/P-114025  | New Media Knowledge village for innovative eLearning Solutions (KNOSOS)   | Technical University of Crete - Laboratory of distributed multimedia information systems and applications (TUC/MUSIC) | Multimedia                              | Organisations                  | GR |
| EL/2002/B/F-114042  | Distance and life long training for the deaf people in the e-commerce and new technologies sector via eLearning tool          |   | Language training                       | Deaf people                    | GR |
| EL/01/C/F/RF-80704  | Teleinformatics system for continuous collection, processing, diffusion of material for teacher training in special education | Institut of Communication and Computer Systems (ICCS-INTUA)   | Adult education                         | Teachers                       | GR |
| E/00/B/F/PP-115083  | Environmental Management System Self-Education by Internet (SAVIGMA)  | Spanish Association for Quality (AEC)   | Adult education                         | Manager                        | ES |
| E/00/B/F/PP-115131  | E-Content   | Dirección General de la Sociedad de la Información  | Multimedia                              | Young entrepreneurs, employees | ES |
| E/01/B/F/PP-115442  | Aprendiendo a resolver - entorno amigable de Formación en Internet para personas con discapacidades (Learning to solve)       | Fundacion once  | Adult education                         | Handicapped people             | ES |
| E/01/B/F/PP-115485  | MS-NET: how to access training through the net  | Federación Española para la Lucha contra la Esclerosis Múltiple   | Adult education                         | People handicapped with MS     | ES |
| E/01/B/F/PP-115487  | Tecno Zeinu: Edición de Materiales Multimedia para la Enseñanza - Aprendizaje de la Lengua de Signos                          | Asociación de Sordos de Bilbao  | Language training                       | Deaf people                    | ES |
| 115545              | eLearning environment in sports training (OLYMPIA)  | Diputació de Barcelona  | Business economics; business management | Sports managers                | ES |
| E/01/B/F-115560     | Automove II - Multimedia Autoformativo, Sección Carrocería, Chapa y Pintura   | Asociación de Empresarios de Automoción de Gipuzkoa   | Technology                              | Logistics                      | ES |
| EUR/01/C/F/NT-84604 | Social and sector based eLearning enhanced by professional ODL networks   | European Federation for Open and Distance Learning (E.F.ODL)  | Language training                       | VET                            | B  |
| EUR/00/C/P/PP-94407 | Enhanced Training in European Cardiology through the use of ICT   | Société Européenne de Cardiologie (SEC)   | Medicines                               | Doctors                        | F  |

|                      |  |  |     |
|----------------------|--|--|-----|
| F/02/B/P/PP-118004   | Professionalisation de la prise en charge des personnes âgées  | Groupement d Intérêt public - formation tout au long de la vie                                       | F   |
| FIN/00/B/F/PP-126506 | Customdp - A System for Creating and Offering Customisable Training Material Applied to Digital Printing   | VTT Information Technology   | FIN |
| FIN/00/B/F/PP-126521 | ENV-Inter - The integrative applied environmental program  | Vaasa Polytechnic  | FIN |
| FIN/00/B/F/PP-126558 | NetPro II - Network Based Project Learning II  | Espoo-Vantaa Institute for Technology EVITech  | FIN |
| F/00/B/P/LA-118210   | SIAL - Support Informatique Auto-dirigé des Langues  | CCCL - Centre culturel et de coopération linguistique de Brema                                       | F   |
| F/02/B/P/PP-118012   | Access technical training on line  | Institut Nicolas Copernic CIPL IAEE  | F   |
| F/02/B/P/PP-118018   | Virtual Classroom of assistance for risk assessment  | Ligeron SA   | F   |
| F/02/B/P/PP-118026   | Outils pour le development des technologies de l'information et de la communication dans les formations professionnelles agricoles, pour la réduction de la fracture numérique et des inégalités | Ecole nationale de formation Agronomique   | F   |
| F/02/B/P/PP-118033   | Modules de formation sur la Qualité de Production en exploitations vinicoles es fromageres - Tracabilité- Sécurité Alimentaire dans les Petites et moyennes Entreprise                           | M2A Technologiques Sarl  | F   |
| F/02/B/P/PP-118044   | Guide de préconisations en matière d'ergonomie cognitive appliquée à la conception e l'organisation de FOAD  | Centre interprofessionnel de promotion économique et sociale   | F   |
| F/01/B/P/PP-118060   | Juvenes Mobiles  | CNAM - Conservatoire National des Arts et Métiers  | F   |
| F/02/B/P/PP-118061   | Compétence Internationales Evaluées par Logiciel   | Université de la Mediterranee  | F   |
| F/02/P/PP-118074     | Internet-based performance centred instruction-the link between work and education   | Centre de formation professionnelle continue en Microélectronique et Microsystemes-Minatec-Cime-Inst | F   |
| F/01/B/P/PP-118089   | Optic - Optimisation Pédagogique des Technologiques de l'information et de la Communication  | CCI de la Drome  | F   |
| HU/01/B/F-136029     | Advanced on-the-job e-Training solutions in e-business for SMEs  | John von Neumann Computer Society  | F   |
| HU/00/B/F/LA-136105  | Language Education Centre of the University of Szeged  | Distance Education Centre of the University of Szeged  | HU  |

|                     |  |   |   |  |    |
|---------------------|--|---|---|--|----|
| HU/00/B/F/LA-136107 | Metallurgies Expressions Translation System (Metaltransys)   | BA.CO Industrial and Service Ltd.   | Language training                       | Metallic industry                            | HU |
| HU/00/B/F/LA-136111 | Neue Kommunikationsformen im Handel - Deutsch - Niederländisch - Ungarisch   | Discimus Geschäftsschule  | Business economics; business management | Students                                     | HU |
| HU/01/B/F/PP-136007 | Database of industrial and commercial standard analytical procedures for quality control that can be used on vocational courses in European schools accessible on the internet | Petrik Lajos Vocational Technical High School of Chemistry, Ecology and Informatics | Technology                              | Food technology                              | HU |
| HU/01/B/F/PP-136012 | Best practice in E-Commerce and Job Role Qualifications  | Computer and Automation Research Institute of the Hungarian Academy of Sciences     | Business economics; business management | Manager, SMEs                                | HU |
| HU/00/B/F/PP-136029 |  | Université de Veszprém  |   |  | HU |
| HU/00/B/F/PP-136037 | Content and Methodology Revision of an Accredited Post - secondary Training Programme for Harmonisation with the EU  | SZÁMALK Vocational School   | Language training                       | Students                                     | HU |
| HU/01/B/F/PP-136042 | A contribution to the development of the efficiency of the international business relationships of SME   | Heves County Chamber of Commerce and Industry                                       | Business economics; business management | Manager SMEs                                 | HU |
| HU/00/B/F/PP-136046 | Outils et dispositifs pédagogiques transférables pour la filière caprine   | Lycée Agricole et des Métiers Gábor Bethlen   |   | Agriculture                                  | HU |
| HU/01/B/F/PP-136049 | Developing a Virtual Market for Practice Firms   | National Institute of Vocational Education  | Business economics; business management | Banking                                      | HU |
| I/00/B/F/LA-120587  | Innovative Tools and Methods for Learning English for Public Administration Managers (ALIM)  | Fondazione Alma Mater - Università degli Studi di Bologna                           | Language training                       | Public Administration                        | I  |
| I/00/B/F/PP-120048  | Laps (Tecno) Village   | Cinema di Piccoli s.n.c.  | Multimedia                              | Students                                     | I  |
| I/01/B/F/PP-120069  | Multimedia & Open Learning for Innovation in Education and Retraining of the Theatre and Entertainment Sector (MOLIERE)  | AMITIE  | Multimedia                              | Theatre Event-Technicians                    | I  |
| I/01/B/F/PP-120550  | Sofianet O.D.L. learning center european network (SOLE)  | I.T.S.O.S. Marie Curie  | Language training                       | Teacher, Manager                             | I  |
| I/00/B/F/PP-120602  | European standards and tools for O.D.L. trainers (POLE STAR)   | SINFORM s.r.l.  | Language training                       | Universities, schools, trading organisations | I  |
| I/00/B/F/PP-121052  | Electronic Commerce-Telework-Telecontrol (AGORA 2000)  | I.T.I.S. Enrico Fermi   | Multimedia                              | Trainer, pupils trainees teachers            | I  |
| I/01/B/F/PP-120312  | European System of Distance Learning in Statistical Technique for Quality Improvement (EUDITSTAT)  | CSCI - Consorzio Scuola-Comunità-Impresa  | Technology                              | Students, teachers, jobless people           | I  |
| I/01/B/F/PP-120132  | European computer networking Licence (supported by eLearning ECNL)   | ELEA S.p.A.   | Technology                              | Teachers, young people                       | I  |

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| I/01/B/F/PP-120209   | Pilot Project for updating of teachers in the use of new communication technologies for the cognitive development of young people (TIC E COGNITIVISMO) | Istituto Statale d'Arte  | Technology                              | Teacher, Students, public administration, organisations | I   |
| IRL/02/B/F/PP-119113 | ECASME - eCapture of SME training needs and specification  | ULIM-EMCR Educational Media Research, University of Limerick                       | Adult education                         | SME employees   | IRL |
| IRL/00/B/P/PP-119209 | From eLearning to eLearning  | Ericsson Systems Expertise   | Technology                              | Students  | IRL |
| I/01/C/F/TH-81403    | European Model for Distance Education and Learning   | Tuscany region   | Business economics; business management | Manager   | I   |
| I/00/C/P/TH-92002    | E-Learn  | Scienter S Cons r.l.   | Adult education                         | Teachers  | I   |
| LT/01/B/F/PP-137006  | IT Academy: eLearning for SMEs   | Kaunas Regional Distance Education Study Centre at Kaunas University of Technology | Business economics; business management | Manager in SME  | LT  |
| LT/00/B/F/PP-1370020 | Distance Education for Librarians: Creating an Information Competent Society   | Vilnius University, Faculty of Communication                                       | Adult education                         | Librarians  | LT  |
| LT/00/B/F/PP-1370024 | Biomedical Physics in Vocational Training at different Levels: targeting Distance Education  | Vilnius University, Physics Faculty  | Medicines                               | Doctors, students, nurses                               | LT  |
| LV/00/B/F/PP-138003  | Long-distance tutorial network in "Logistics Information Systems" based on WEB technologies (LOGIS)  | Latvian Intelligent Systems, Ltd.  | Technology                              | Logistics   | LV  |
| LV/01/B/F/PP-138003  | Internet based training programmes for eLearning: building and industrial automation incl. Wireless technologies                                       | Klinkmann Iat  | Technology                              | Industry, Engineers                                     | LV  |
| N/00/B/LA/FP-131040  | ICT-based Vocational Communication for SMEs in Europe (VoCTE)  | Ostfold University College   | Language training                       | SME employees   | N   |
| NL/00/B/F/LA-123034  | DICTION - Transnational project e-languageLearning   | Leeuwenborgh Opleidingen   | Language training                       | VET   | NL  |
| NL/00/B/F/PP-123007  | Innovative Training for the meat sector in central & amp eastern European countries  | Foundation ECCEAMST  | Adult education                         | Butcher   | NL  |
| NL/00/B/F/PP-123015  | Multimedia distance training package for eastern Europe on integrated coastal management   | European Union for Coastal conservation  | Language training                       | Politicians, people responsible for coast protecting    | NL  |
| NL/02/B/F/PP-123217  | EuroCADcrete   | Betonvereniging  | Technology                              | Students, engineers                                     | NL  |
| NL/02/B/F/PP-123220  | Digital learning at primary school   |  | Technology                              | Teachers, students                                      | NL  |
| NL/02/B/F/PP-123225  | InTEL  | Mondriaan Onderwijsgroep   | Technology                              | Laboratory assistants, students                         | NL  |
| NL/02/B/F/PP-123226  | CONTINUED  | PTGroep  | Technology                              | Welder  | NL  |
| N/01/BPP-131014      | SUPERCOMET:Superconductivity Multimedia Educational Tool   | Norwegian University of Science and Technology - NTNU                              | Technology                              | Teachers  | N   |
| N/00/B/PP/FP-131055  | ReDMEIS: Relocation and Development of a Model for Education, Industry and Society in Collaboration  | Rogaland Training and Education Centre   | Adult education                         | Schools, industry                                       | N   |

| PL/01/B/F/PP-140302 | Electronic Work Simulators (EWS) - software for training and testing the physically disabled for (tele)work in Customer Relationship Management (CRM)   | Institute of Mathematical Machines  | Technology                              | Manager SME                                   | PL  |
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| PL/01/B/F/PP-140347 | Transnational Vocational Counselling  |   | Language training                       | Lawyers                                       | PL  |
| P/01/B/F/PP-125201  | Net-Arts Virtual Communities  | Instituto de Desenvolvimento Social   | Multimedia                              | Students                                      | P   |
| P/01/B/F/PP-125212  | Novas Competencias e Formacao Inovadora para Representantes dos Trabalhadores   | CGTP-IN   | Adult education                         | SMEs  | P   |
| P/01/B/F/PP-125239  | TV Inteactiva: Novos Conteudos, Nova Formacao   | ETIC - Escola Técnica de Imagem e Comunicacao   | Multimedia                              | TV  | P   |
| P/00/C/P/RE-92553   | Web Education Systems (WEB-EDU)   | TECMINHO  | Multimedia                              | Public administration, teachers, web designer | P   |
| RO/01/B/F/PP-141024 | Using information & communication technologies in development of virtual & remote laboratories for initial & continuous education oriented on efficient professional (re)insertion in electrical domain | Transylvania University of Brasov Romania   | Technology                              | Teachers                                      | ROM |
| RO/00/B/F/PP-141176 | Open and distance training programme for alternate labour market services promoters   | N.T.U.C. "Cartel Alfa" -Department for Education, Training and Programmes   | Language training                       | Manager, teachers, tutors                     | ROM |
| SK/01/B/F/LA-142248 | Interactive Learning of Vocational German for Forestry Staff  | Ustav pre vychovu a vzdelavanie pracovníkov lesného a vodného hospodárstva SR/The Institute for Training and Education of Forestry and Water Management Staff of the SR | Language training                       | Forestry workers                              | SK  |
| SK/01/B/F/PP-142203 | Satellite Multimedia and Rapid Transfer of Education  | Main DATA s.r.o.  | Adult education                         | Teachers                                      | SK  |
| SK/00/B/F/PP-142226 | Regional development by distance learning of SME managers   | Ekonomická univerzita/University of Economics   | Business economics; business management | Start ups, SME employees                      | SK  |
| RO/00/B/F/PP-114125 | Acquisition of complementary competencies through open and distance education   | Technical University of Cluj-Napoca   | Business economics; business management | Students, SME employees                       | ROM |
| SK/01/B/F/PP-142243 | Online distance learning module in European agrarian law  | Slovenská poľnohospodárska univerzita Slovak Agricultural University  | Adult education                         | Students                                      | SK  |
| SK/02/B/F/PP-142256 | Efficient eLearning network services establishment for education without borders  | Faculty of Electrical Engineering and Informatics, Technical University of Kosice   | Adult education                         | Teachers                                      | SK  |
| SK/02/B/F/PP-142261 | Information and Communication technologies in Lifelong Learning, ICOTEL   | Association of the Electro technical Industry in the Slovak Republic  | Adult education                         | Manager in SME, engineers                     | SK  |
| S/01/B/F/LA-127024  | LENTEC - Learning English for technical purposes  | City of Malmö, department of Education  | Language training                       | Students, teachers                            | S   |
| SI-143008           | Computerised laboratory in science and technology teaching  | University of Ljubljana, Faculty of Education   | Technology                              | Pupils, trainees, laboratory assistants       | SLO |

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| S/01/B/F/NT-127011  | ELAN 2 - The European Learning Automotive Network                                 | Volvo Truck Corporation                                 | Technology                              | Universities, research institutes, schools for managers | S  |
| S/01/B/F/PP-127014  | Energy Skill-Development of a Vocational Training Tool                            | The Regional Energy Agency in the County of Halland     | Language training                       | Energy manager  | S  |
| S/01/B/F/PP-127015  | Virtual Glass Academy - a pedagogical model for eLearning with multimedia support | GLAFO, Glass Research Institute                         | Technology                              | Glass producing industry                                | S  |
| S/00/B/F/PP-127025  | TRAM - Trade Management   | Swedish Trade Council                                   | Business economics; business management | Selling manager   | S  |
| S/00/B/F/PP-127033  | Euracademy  | Swedish University of Agricultural Science, SLU Kontakt | Business economics; business management | Start ups, development manager                          | S  |
| UK/00/B/F/PP-129071 | Supporting Online Learning and Teaching   | e-Novate Consultancy Limited                            | Business economics; business management | Management  | UK |
| UK/00/B/F/PP-129110 | On-Line Intelligent Training System for Internet marketing by SMEs (TRIMAR)       | Luton Business School, University of Luton              | Business economics; business management | Marketing manager                                       | UK |
| UK/00/B/F/PP-129117 | Supply Chain Management in the Music Industry across the Internet                 | University of Huddersfield                              | Business economics; business management | SME employees   | UK |
| UK/00/B/F/PP-129134 | Real Estate Graduate Accredited Learning  | The Royal Institution of Chartered Surveyors            | Adult education                         | Students  | UK |
| UK/01/B/F/PP-129308 | European Medical Imaging Technology Training (EMIT)                               | King's College London                                   | Medicines                               | Hospitals   | UK |
| UK/01/B/F/PP-129324 | Construct iT Europe   | Bridgend College  | Technology                              | Students  | UK |
| UK/01/B/F/PP-129462 | International online vocational training in surface engineering                   | The Institute of Materials                              | Technology                              | Engineers   | UK |
| UK/01/B/F/PP-129355 | Web-based Information Technology Training   | Trades Union Congress                                   | Technology                              | Public services   | UK |
| UK/01/C/F/RF-82907  | ICT learning and training - an exploration of data in the EU                      | London School of Economics and Political Science (LSE)  | Adult education                         | Politicians   | UK |